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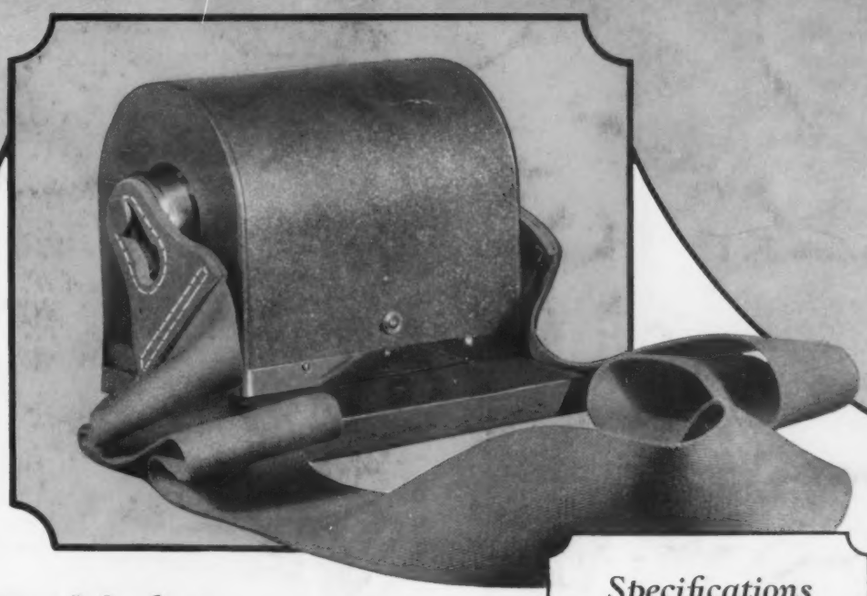

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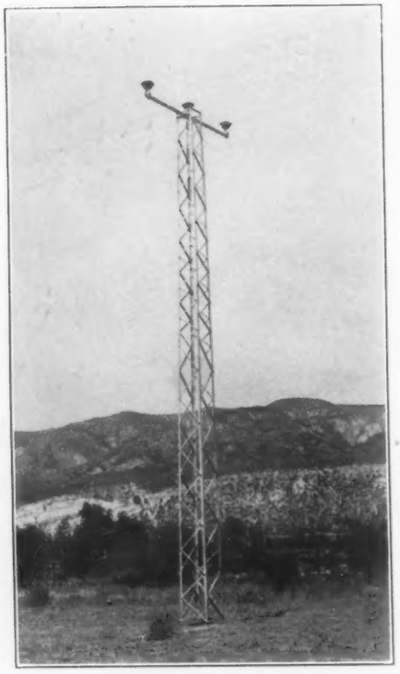

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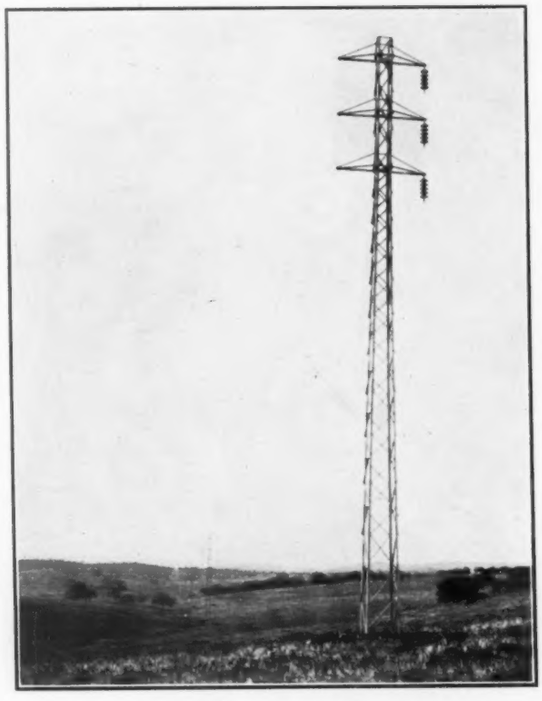

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C. T. HUTCHINSON, *Editorial Director*
G. C. TENNEY, *Managing Editor*
G. R. HENNINGER, *Associate Editor*
W. A. CYR, *Associate Editor*
D. D. PEEDE, *News Editor*
B. H. SNOW, *Northwest Editor*

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Electrical West

C. T. HUTCHINSON, *Editorial Director*

With which is consolidated the Journal of Electricity
A McGraw-Hill Publication

G. C. TENNEY, *Managing Editor*

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Employees Vital Factors in Public Relations Is Theme of Northwest Convention

IF the twenty-second annual convention of the Northwest Electric Light & Power Association, held at Seattle, June 26-28, 1929, can be said to have had a theme, that theme was public relations. From the welcoming address by W. H. McGrath, vice-president, Puget Sound Power & Light Company, at the opening of the first general session, until the closing of the third session by a wonderfully inspirational message from J. F. Owens, vice-president, N. E. L. A., the successive speakers took up one or more of the many ramifications of the public relations problem, analyzed them and suggested ways in which to meet them.

Among the problems most frequently referred to were the encroachment of government into business, the interference of governmental agencies with business, the attacks of out-and-out enemies of the industry, and the feeding of the fire of unfavorable opinion with the fuel of misinformation and misrepresentation by a section of the press seeking sensation for its news columns. The one outstanding message of the convention was that the remedy lay in the hands of the rank and file of workers in the industry—270,000 of them—who could and would by their actions and through their contacts eventually bring a correct public understanding of the honest aims and practices of the industry. This message was voiced by no less than seven of the principal speakers, and found its fullest expression in the commanding eloquence of Mr. Owens' address on "Human Values."

A feature of considerable interest and significance was the introduction of talking motion pictures by which important messages from prominent men who were unable to be present were brought to the convention, with the retention of that most vital requisite of the effective speech, the personality of the speaker as conveyed to the consciousness of the audience by the speaker's voice inflection, gestures and facial expression. In addition there were shown for the first time sound pictures of some of the scenes of the N.E.L.A. convention just completed at Atlantic City.

M. L. HIBBARD

Vice-president and general manager of the Idaho Power Company, Boise, was elected president of the association for the forthcoming year.

The program was presented in four general sessions, two on Wednesday, June 26, one Thursday morning, and one Friday morning on the boat en route to Victoria. In spite of the apparent preponderance of public relations material, or of subjects having a public relations aspect, the other branches were also amply represented. The Accounting Section was heard during a part of the Thursday afternoon session, the balance of the session being divided between the Commercial and Engineering Sections. Thursday morning was given over to the Public Relations Section for a review of its work, a feature of which was the finals in the public speaking contests conducted during the year. An additional feature in this session was the presentation of the playlet, "Front Page News," brought direct from the Pacific Coast Electrical Association convention. The Friday morning session on the boat was likewise divided between the Commercial and Engineering Sections.

For entertainment the delegates were treated to an innovation in the boat trip to Victoria, which lasted all day, giving a full afternoon for sightseeing, golf and other pleasures. Besides this event, moreover, the days and nights in Seattle were overflowing with activities of all sorts so that not a dull moment was experienced.

In point of size, this was the largest convention ever held by the association, there being 431 men and 287 women registered. In spite of an attendance exceeding expectations the general convention committee under the leadership of C. R. Wallis, General Electric Company, Seattle, took care of the visitors in a manner to bring forth much commendation, and it was generally expressed that a high mark in convention excellence had been established.

In the following pages each item of the convention program is presented in resume so that those who were present may refresh their memories on the things they want to tabulate mentally, or pass on to other members of their organizations, while those who were not able to attend may gain an idea of what was said and done.

McGrath Pleads for Simplicity in All Phases of Utility Operations

THE laying down of seven cardinal duties of public utility companies, the sketching of some high lights in the growth of the industry, the spotlighting of a variety of ways in which the companies of the Northwest had pioneered, the outlining of the enormous opportunities for commercial development ahead, the plea for simplification of rates and business methods, and the expansive hospitality offered the guests of the convention characterized the address of welcome of W. H. McGrath, vice-president, Puget Sound Power & Light Company, Seattle, as the keynote speech on which much of the later discussion was to elaborate. Extracts from his address follow.

"The electric light and power business now has invested $10,300,000,000. In 1902 the gross earnings in the entire United States were $85,000.000. Twenty-six years later they were twenty times as much. There are 25,000,000 customers in the United States.

"Practically the only service or commodity in the world which is sold today at less than the 1913 price is electric

GOOD SHOW, DICK
N.E.L.A.'s Clapp and Pepco's Griffith, McMicken and Coldwell give President Boykin cause to smile.

light and power. For the United States as a whole rates are 20 per cent lower than they were in 1913, while the average cost of living is 70 per cent higher.

"Tremendous economies have been effected by our companies in the manufacture and production of power by steam. In the last five or ten years greater reductions have been made in the cost of steam production than ever before in our history, and it has reached a point where the cost of power production from steam very closely parallels hydro-electric power costs, and in many instances is cheaper.

"We should strive for simplicity—simple engineering, simple construction, simple rate structures, simple statements to the people, to the public service commissions and to the press. I am a strong believer that the more simple we can make our business the clearer it will be understood not only by ourselves but by others."

The seven duties he laid down were, first, to render good service to the public at the lowest fair rates to the company; second, to provide efficient, economical, and far-sighted management; third, to pay fair and reasonable wages to employees; fourth to pay a fair return on the capital invested, and to safeguard in every way possible its ultimate redemption, "which in the last analysis is a duty to the public itself, since one of the largest costs is the cost of money, and good credit is an essential to low cost;" fifth, to pay fair taxes to our communities; sixth, to present to the public full publicity as to our hopes, our troubles, our financial performance —full public explanation of our acts. The seventh was expressed in the following language:

"Having done these things, however, I think we have one last duty—last but not least . . . that is to attack vigorously, unafraid, the entrance of government into private business. If that goes on, whether it be by the state or by the nation or by the local community, it will not only wreck the businesses in which we are engaged but it runs counter to the very principles upon which this nation was founded, and, in the long run, in my opinion, will destroy the happiness, the health and prosperity of all our people."

Griffith Answers Attacks on Industry

Responding to the address of welcome, Franklin T. Griffith, president, Portland Electric Power Company, Portland, made a plea to the employees of the industry to carry their own convictions to their various contacts, as a means of combating the attacks leveled at the industry. He argued briefly against government entering business, pointing out that it was the stimulus afforded by the individual's hope of reward under private enterprise that had been responsible for the world's advance. In addition he brought to light a number of ways in which unfair comparisons unfavorable to private business had been published in the Northwest at the instigation of municipal ownership advocates.

Referring to the attacks leveled at the industry during the past year he charged each employee to search his own heart and head to see if he could find anything wrong, or penal or criminal in the activities of his own company. He pointed to the fact that newspaper accounts of the industry's activities represented not public opinion but the opinion of one man, the writer, and urged the employees not to fall into the habit of believing everything appearing in the paper.

Pointing out that people were prone to read only what they like to believe, he deprecated the value of attempting to fight the unfair attacks through the written word but urged that the spoken word was an effective weapon. He closed with a plea that the entire personnel of the public utility organizations combat the attacks among their own friends and acquaintances, saying:

"If you believe in this industry, don't depend on your executive head to get

RESPONDER GRIFFITH
. . . a word-of-mouth campaign to counteract unfair interpretations of the industry's acts. . . .

it over to the public by putting it into the newspapers. The people won't read it; but they will understand what you say to them. If the men and women engaged in this industry throughout the length and breadth of this land were themselves entirely sold on their jobs, if they believed in their own future, if they believed that to safeguard the interests of all the people they ought to give the truth to those with whom they come in contact, our job would be done."

Talking Movies Are Feature of Convention Program

Spectacular was the closing of the first general session by a presentation of men of national and international prominence through the medium of the movietone. Thomas A. Edison, speaking from an easy chair in his Florida garden, and Sir Ernest Benn, well-known economist of London, likewise pictured in the surroundings of his own home, had been seen by visitors to the N.E.L.A. convention at Atlantic City and the Pacific Coast Electrical Association Convention at Del Monte. In addition to these, some of the action scenes attending the opening of the Atlantic City convention, in which were seen and heard M. S. Sloan, president-elect, P. S. Arkwright, retiring president, and Paul S. Clapp, managing director, of the N.E.L.A., were shown for the first time outside the laboratory. Technical excellence of these talking pictures had been secured by capable direction of the Fox Movietone, and the filming of the Atlantic City convention proceedings is said to be the first of such portrayals ever attempted.

The very convincing logic and sprightly originality of Sir Ernest Benn's discussion of the "Superiority of Private Enterprise" has created wide interest since its first presentation at Atlantic City. His talk was reported practically in full in Electrical West, July 1, 1929, p. 4.

Mr. Edison spoke briefly of some of the obstacles encountered and overcome in the development of the first commercial incandescent lamp and the Edison system of distribution, and closed as follows: "It is a great reward for me and my colleagues, and co-workers, many of them still living, that we have survived to see the fruit of our labors. The record of the electrical industry is wonderful, but fine as it is, it can be made still better, and I have a feeling that in your hands it will be."

The keynote of Mr. Sloan's message was that the industry must sell more power on existing lines, that is, increase the revenue per dollar of investment, or face the necessity of increasing rates. His address entitled, "Sales Increase or Rate Increase," is reported at length in Electrical West, July 1, 1929, p. 3.

Great was the enthusiasm and acclaim at Atlantic City, as transported to the Venetian Room of the Olympic Hotel, Seattle, by the movietone when Preston S. Arkwright mounted the platform and declared the fifty-second convention of the National Electric Light Association open for business, and much of the excitement of the moment was transfused into the feelings of the Seattle audience as they heard the vibrant well-modulated voice of the president acknowledge the cheering. Mr. Arkwright, after a few words of greeting, introduced Paul S. Clapp, who marked the progress of electrical development during the year in much the same manner as he had done in person earlier in the session, his address at that time being more fully reported under another head.

A public showing of these and additional movietone films was made at an extra session provided for the purpose the following afternoon.

NATIONAL OFFICERS CLAPP AND OWENS

. . . in person, not in talking motion pictures, brought messages of national progress, words of counsel and advice. . .

President Boykin Warns of Dangers of Grange Power Bill in Annual Report

THE proposed Grange Power Bill to be voted on by the people of Washington at the next general election, steam versus hydro generation, rural electrification, the Federal Trade Commission investigation and government in business were subjects ably discussed in the address of the president, R. M. Boykin, Puget Sound Power & Light Company, Seattle. In addition President Boykin paid high tribute to the work of the four sections.

PRESIDENT BOYKIN

. . . reviewed progress, analyzed the dangers of the district power bill up for popular vote in Washington in 1930. . .

In his analysis of the Grange Power Bill, which provides machinery by which utility districts may be formed for the development and distribution of electric power, he showed that extraordinary powers of bonding, taxing and assessing local property would be vested in the hands of district commissioners, and that such powers, while actually very dangerous ones to hand over to a few men, were, by shrewd wording, made to appear innocuous and harmless. The bill was being sponsored by certain officers and members of the State Grange in collaboration with the sponsors of the Bone Bill of former years ostensibly "to conserve the water power resources of the state for the benefit of the people," and his conclusion, after anaysis, was that the bill was drafted not for the purpose of competition but "with the sole object of driving power companies from the State of Washington."

Stating that the reason given by the Grange for initiating the bill was that the farmers of the state were not receiving electric service at the hands of the electrical industry, he proceeded to controvert this by presenting the fact that 26,000 farms in western Washington were now electrified as against 10,000 in Ontario, of about the same area but greater in population, which is under government operation. A further comparison between the two localities showed that although the government puts up about one-half of the cost of providing the farmers of Ontario with service, rates there are higher than anywhere in western Washington. A continuation of the policy of Northwest companies of extending service to rural communities, a policy that has brought service to 65,000 farmers in the territory, was urged as a means of strengthening the resources of the territory.

Asserting that the Federal Trade Commission's investigation of the power industry has been remarkable chiefly for the frankness with which the testimony was given and for proof that the industry has done nothing that any fair-minded person can construe as detrimental to the public interest, he continued: "Neither the commission nor any other agency of government has sought to rebuke, much less to restrain, the widespread propaganda against the industry. This propaganda runs along without official interference until it breaks down by contact with hard facts. But the commission's inquiry, by inference at least, has suggested that the power industry has no right to defend itself and should make no effort to justify its honest purposes by spreading knowledge of the truth. American public opinion does not now, and never will, sustain the notion that ours and other great legitimate industries must remain silent under the sweep of misrepresentation and faleshood."

Discussing government in business, he said: "The persistent encroachment of governmental agencies on business generally is little more than a manifestation of zeal for mischief-making. . . . The thought is forced upon us that it is not the government itself which is interfering and quarreling with business, but rather the demagogues who have won a place on the government payroll that they must hold at any cost to others, or who have somehow gained influence with government bureaus and agencies. Such demagogues are sincere only in their desire to hold their jobs or attract public attention."

Calling attention to the fact that the basis of the attack on the industry in some quarters is "a wilful misconception of hydro-electric power, its generation and economic value," he cited the increase in efficiencies in steam generation as offering a challenge to hydro development even on the Pacific Coast where 56 per cent of the available water power of the nation is located, and predicted that when these facts became better known we would hear less of the supremacy of water power. He closed by drawing attention to the rapidly developing physical characteristics of the industry and entered a plea that ignorance within the industry be eradicated.

Back Advertising With Good Service Is Warning of Prof. Burd

A SEARCHING resume of some advertising problems of public utilities, by Dr. Henry A. Burd, University of Washington, Seattle, was a feature of the first general session Wednesday morning. Dr. Burd's address classified utility advertising into three groups—merchandise, security and good will advertising, confined its consideration to the last class, analyzed the problems presented and suggested ways in which they might be met.

Public utility advertising, he stated, was divided into merchandising 53 per cent, security 10 per cent and good will 37 per cent. He maintained that all these types had been effective, and threw out a caution in connection with security advertising, calling attention to the possible danger of wide fluctuations in the stock sold by this advertising, and asking the question, without attempting to answer it, "What will be the amount and condition of the good will your customer owner will hold—he being not investment wise—toward the utility which sold him the stock, if and when the stock falls off materially in price?"

Contending that the public's attitude toward utilities was qualitatively different than it was toward other businesses, he brought out five phases of the public attitude, a knowledge of which would necessarily affect the good will advertising designed to bring the public understanding into harmony with the industry's aims and purposes. In the first place the size of the units was cited as being a factor in making the public suspicious. In the second place, the public's natural antagonism to monopolies, without a thorough understanding of what constitutes the difference between a natural monopoly and one that does not derive its monopolistic character from natural conditions, was shown to affect the public attitude.

Thirdly, he listed trade associations as being a source of possible doubt in the public's mind, because of the complex nature of modern business and the difficulty of getting across a complete explanation of the functions of such organizations. As a fourth consideration he named the probable misinterpretation placed by the public on the industry's attempt to protect itself from the effects of inimical legislation. And for the fifth problem to be met, he included the burden of combating the sinister inferences drawn from the reports of a certain section of the press which believed that news was not news unless it was tinged with sensationalism.

A thorough understanding of the problems represented by these influences on the public attitude, he maintained, could be intelligently applied to the preparation and use of good will or institutional advertising, and he advised a continuance of this activity in the usual media. In addition, he urged the developing of the quality of employee contact for the purpose of seeking the solution to the problems through the spoken word, classifying this as advertising in the same degree as paid space in publications.

In conclusion, he said: "Now in the final analysis, all of your advertising, whether it be by the paid-for printed word, or whether it be by personal, individual contact, must continue to be, in an increasing degree, sincere enough to be believed, earnest enough to be persuasive, and sufficient in quantity to keep you constantly favorably before the public; and it must be backed up by a service and a customer and public relationship worthy of the magic product that you merchandise and of the important strategic position you occupy in the community you serve."

Paul Clapp Gives Stirring Message of Progress

Major steps in the industry's progress during the past year, some of the trends in its development, plans for the Golden Jubilee of Light, and a report on the Federal Trade Commission investigation constituted the message from N.E.L.A. headquarters brought to the convention at its first session by Paul S. Clapp, managing director. It was a stirring message of progress, of inspiration, of hope and of the will to carry on.

He pointed to the connecting of 1,000,000 homes during the year and the increase of 15 per cent in the domestic use of electricity as a contribution to the national well being. Factory electrification with its attendant favorable influence on the condition of the workers and on the general prosperity of the country was likewise pointed to as a mark of continuing progress. One important trend he emphasized was the lowering price received for service and the increasing cost of supplying that service as it reaches out farther and farther to the smaller towns and farms. This, he pointed out, had slowed down the rate of capital turnover from once in four and three-quarter years in 1922 to once in five and one-half years in 1928, and necessitated the securing of larger and properly diversified connected load as a remedy.

He told of plans for the celebration of Light's Golden Jubilee, to culminate in an elaborate ceremony of the dedication of the Edison School of Technology by Henry Ford at Dearborn, Mich., Oct 21, and urged the electrical industry to stand ready to assist in and initiate local plans for tying in with some form of celebration.

After describing the nature of the Federal Trade Commission's investigation of the industry and tracing its progress, he asserted that the instigating force behind the investigation was the group which advocates government ownership and operation, and he defended the industry's stand on the question in the following language: "They have a right to the expression of their views, but I can assure you that, in so far as I can speak for the National Electric Light Association, and in so far as I can speak for the various utility companies, we would be delinquent in our responsibilities to our investors, we would be delinquent in our responsibilities to our customers, and beyond that we would be delinquent in our responsibilities to our own selves, if we did not, in season and out of season, continuously combat and resist the aggressions of those who favor that principle."

He closed with an exhortation to carry on as follows: "The industry is not power houses; it is not transmission lines; it is not dams nor meters; the industry is made up of human souls, 270,000 of them, of whom you and I are a part. Whatever may be the misrepresentations, whatever may be the misinterpretations, we must go forward with more courage and more vigor than ever, confident that time will make clear the objects and the spirit which actuate us, and will make clear the high sense of responsibility which we have for the obligations of the public service in which we are engaged."

Accounting Section Studies Utility Taxation

Reporting briefly for the Accounting Section at the opening of the second general session, Wednesday afternoon, A. E. Janssen, Idaho Power Company, Boise, section chairman, referred to the committee reports presented at the section's meeting in Portland, March 18, later published in the May 15 issue of Electrical West.

In addition to commending the more or less routine work conducted annually by the committees corresponding to the national accounting committees, Mr. Janssen paid high tribute to the foresight of last year's chairman, F. W. Brownell, Puget Sound Power & Light Company, Seattle, who had instituted a broadened scope of activity for the section by the establishment of a research committee to conduct studies of particular value to member company executives. The research committee had, he reported, completed its tax study begun the previous year, and made its report to the executives. In

addition the committee this year had undertaken and completed a study of wage scales in effect in the association's territory, and was prepared at the beginning of the new year to take up whatever study seemed most important at this time. He strongly recommended that the committee be maintained from year to year since there are many important studies of an economic significance to operating executives that can best be studied and reported on in a co-operative way through company accounting departments.

Efficiency in Management Deserves Reward Is Declaration of Prof. Lieb

IN A PROFOUND address before the Accounting Section program at the second session, Wednesday afternoon, on the subject of "Looking Ahead in Business," Prof. Karl E. Lieb, University of Washington, Seattle, stated that efficiency in management would be a determining factor in valuation and consequently in rate making, and urged that a measuring stick be devised by which managements could be compared and tabulated. He pointed out that the customary measure of efficient management, the arithmetical average arrived at by dividing the number of kilowatt-hours into the total revenue to get the earning per kilowatt-hour, employed a falacious principal of statistics due to the widely differing conditions under which such averages are produced. It is up to accountants, he declared, to produce the kind of facts that will measure the efficiency of management in order to secure for the better managed companies the benefits that are bound to accrue.

Prefacing his thesis by calling attention to the "unreasoning, uninformed popular antipathy to certain phases of the industry's activities, based in part on a general dislike for the word 'trust' or 'monopoly,'" he went on to show that it would be impossible to monopolize electric power without monopolizing all the sources from which electric power is generated. "The control of the sources of electric power is competitive control," he said, "and any time that the sources of hydro-electric power become so controlled as to make it possible for any group of people to raise prices to an unreasonable degree, immediate competition from steam power and power generated by internal combustion engines must be faced." This fact is not generally recognized by the public, he stated, and he urged that the industry attempt to create a public understanding that "competition has not been eliminated from the field of production of electric power."

Charging that the industry had lagged in developing the proper type of rates and that rates were based in large part on previous experience, he urged that rate structures and markets occupy the forefront of study for the future. "Getting the service into the hands of the people and inducing them to utilize what you have to offer, and to utilize it at a rate which will be to their advantage and to your advantage, is one of the greatest problems you have to face at the present time. . . I merely wanted to point out the unfairness, the unsoundness, the illogical attitude of those who persist in saying that the existence of a low rate in one spot or under one management is proof of sounder operation than the existence of a higher similar rate in some other place under some other management with different costs of production and with a different type of market to supply."

With an elaboration of these premises before his audience, Professor Lieb developed at length his thesis which simmers down to a plea for a broader conception of responsibilities among accountants and executives. He urged the production of the type of facts that would not only give a history of performance but that would also furnish the basis for prompt executive action for increasing the efficiency of management, and that would, in analysis, reveal the true relative worth of management. "We are not so much interested in history as we used to be; we are more interested in what is going to happen in the next two or three months; and in order to make the fullest use of the facilities we have it is becoming necessary for us to make use of our accounting departments and of our accountants which we didn't need so much in the days of the slower moving and less complicated industry."

He prophesied that efficiency in management, as soon as standards are developed, would be a major factor in rate making, and concluded: "In the long run the company that is able to show efficiency is going to be given credit for it, and the best method that I know of to make sure of efficiency is in establishing standards of what constitutes efficiency. In order to do that you are going to have to get together the facts from your accountants, and then to make use of those facts as indicating something, not that happened last year, but that is going to happen next year. And so, looking ahead in the public utility business has now become a matter of creating an organization and experts in your staff, your management, your executives, your accountants, your statisticians, that can measure conditions, and that can place before the people as well as before your organizations the hard, stubborn, irrefragable facts that will make a lie of a comparison of arithmetic averages and nail it to the table for what it is."

Lewis Reviews Progress of Commercial Section

In reporting for the Commercial Section of which he is chairman, Lewis A. Lewis, assistant general manager, The Washington Water Power Company, Spokane, reviewed the work of the three bureaus, pointed to the sales possibilities lying ahead, and made a plea for a greater understanding by executives of the results to be achieved by commercial activity. "It is too often the case," he said, "that our engineers or operating departments can more easily get the ear of the presidents of their companies to show how a saving of $25,000 in operating efficiency can be made, than can the sales executives to put over a sales program which would increase the revenue from $100,000 to $200,000 a year."

Spotlighting some of the findings of the bureau committees, he called attention to the enormous market available in commercial cooking as reported by

LOAD-BUILDER LEWIS
. . . pointed to sales possibilities lying ahead.

that committee of the power bureau. A survey had indicated that the total fuel bill for hotels and restaurants in the Northwest was $9,000,000 per year of which the central stations receive only $225,000. A specialized sales organization and the establishment of rates that will compete favorably with other fuels were listed as pre-requisites to the securing of this business.

Naming the reports of the commercial and industrial lighting, the street and highway lighting and the electrical advertising committees of the lighting bureau as being outstanding in importance, he laid particular emphasis on the work of the home educational committee, which had carried the story of correct illumination into the home and school through talks to women's clubs and parent teachers' associations. The change from the carbon lamp to the concentrated filament type "C" lamp, he contended, had imposed a responsibility upon lighting men to educate the customers to the proper use of this new brilliancy that has been forced upon

them. "We must think of it not as a means of increasing our sales, although it cannot help but do so, but from a purely humanitarian standpoint."

On the subject of merchandising he pointed to the growing conviction in the minds of successful executives throughout the industry that the residence field represented an enormous opportunity for increasing revenue, and that this load can best be built by introducing appliances to the homes already connected. "The residence load is the backbone of the industry," he quoted one executive as saying, "and is one that can be increased with the least additional investment. . .

"Rural electrification has taken the same position in our discussions that domestic lighting took eighteen or twenty years ago," he said, recalling an old report of 1908 that apparently proved conclusively that residence lighting could never be made to pay. "We can prove to ourselves today that rural electrification cannot be made to pay. Notwithstanding that, in the State of Washington 41 per cent of all possible farms are electrified.."

Food Preservation Program Outlined by McMicken

The sponsorship by the N.E.L.A. of the National Food Preservation Program, its scope, purpose and the mechanical set-up for its successful promotion was told at the Wednesday afternoon commercial session by A. C. McMicken, general sales manager, Portland Electric Power Company, Portland. He quoted the purpose of the program as being, "to bring about a greater national consciousness of the need for adequate food preservation by proper refrigeration, and to enlist all organizations interested in food preservation, nationally and in each local community, for the protection of health and the elimination of waste in foods."

OLD-TIMER McMICKEN
. . . won honorary membership because of 21 years' activity. . .

Among those invited through their national associations to join in the movement, were physicians, women's clubs, electrical and gas industries, ice and refrigerator manufacturers, dairymen, ice cream manufacturers, commercial fishermen, meat packers, fruit growers, and bottlers of carbonated beverages. The program, which will culminate in an elaborate publicity campaign in September, includes the use of essay contests, films, billboards, newspapers, and a variety of media, both national and local, all designed to draw the public's attention to the necessity of adequate food preservation.

To accomplish the local features of the campaign the entire country has been divided into twenty districts each headed by a regional director, of which there are two in this geographic division, Mr. McMicken for Oregon and Washington, and P. M. Parry, commercial manager, Utah Power & Light Company, Salt Lake City, for Utah, Idaho and Montana. Mr. McMicken urged the hearty co-operation of all the electrical industry in the territory in helping to organize and put through the local campaigns, on which much of the success of the movement will depend.

Organization and Aims of S.E.D. Explained

The new organization of the Society for Electrical Development by which all four branches of the industry are represented on its directorate, the promotional activities of the society and the co-operative help it offers its members formed the subject of an address by Kenneth A. McIntyre, managing director, at the commercial session Wednesday afternoon. The new organization was the outcome of a series of conferences begun two years ago, in which it was determined in principle that there should be a common meeting ground for representatives of all branches of the industry, on full equality, to undertake industry promotional activities so as to compete favorably with other co-operative movements fostered in many other industries.

Mr. McIntyre outlined the functions and activities of the society with the aid of explanatory charts. Among the principal activities is the help given to local electric leagues and clubs, organized to do promotional work in individual communities. One of the main activities of these clubs is the promotion of the Red Seal wiring plan and the Franklin specifications for commercial and industrial lighting. He pointed out that as the Red Seal plan becomes better known and more readily sold, the cost per Red Seal job goes down. Some results in six cities where Red Seal wiring is being pushed showed that in Red Seal homes 65 per cent more outlets are installed, 43 per cent more merchandise is sold, and 200 per cent more current is consumed.

Among other activities undertaken and services rendered by the society, Mr. McIntyre summarized the following: the uniform ordinance department, for assisting communities to formulate wiring ordinances in the interest of uniformity; publicity service on the greater use of appliances in the home; material for radio programs and for other forms of advertising; Christmas lighting for communities of all sizes; special preparation for Light's Golden Jubilee this year; plan books on electric sign advertising, electric ranges, refrigerators and other fields of development, as produced by the commercial research department of the society, and others.

He reported further on the progress made by the industry's sales conference commenced two years ago to consider the advisability of a national advertising campaign. This campaign, he stated, had been determined upon and was at the present time in the process of preparation by the J. Walter Thompson Company. It was being timed to start early in 1930 so as not to interfere with this year's major activities, Light's Golden Jubilee and the National Food Preservation program.

Two Insull Medals Awarded at First Aid Program

To drive home in an impressive fashion the humanitarian aspects and the general efficacy of safety-first instruction as carried on in the organizations of member companies, two Insull medals won during the past year were awarded with fitting ceremony, and a first aid demonstration was portrayed in a program during the second session conducted by J. B. Fisken, The Washington Water Power Company, Spokane, chairman of the accident prevention committee.

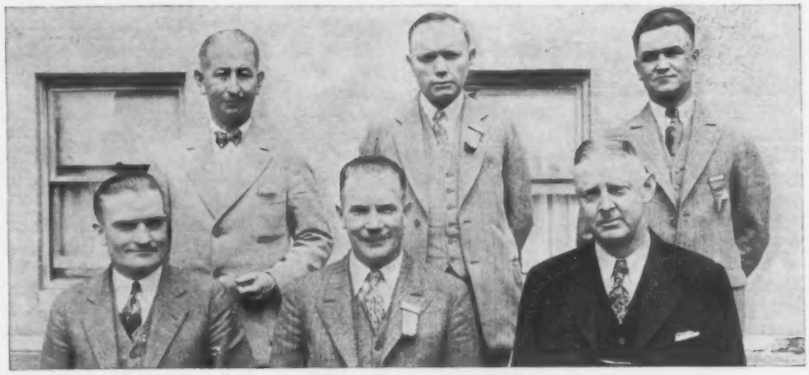
DECORATED
First Alders Murphy and Inglis congratulate Insull Medalists Huling and Danks.

PIONEER FISKEN
. . . rewarded courage, fixed golf handicaps. . .

Insull Medal winners were Andrew J. Huling, Portland Electric Power Company, and L. E. Danks, Mountain States Power Company, and the presentations were made respectively with suitable congratulations by Franklin T. Griffith, president, and C. M. Brewer, vice-president and general manager, of the respective companies of Messrs. Huling and Danks. In each case the circumstances under which life had been saved by the two recipients were recited by the officials making the presentation. The ceremony was preceded by an explanation of the significance of the Insull award by D. W. Proebstel, Portland Electric Power Company, chairman of the Engineering Section.

The trussing in seven minutes, out of the twelve allowed in the Red Cross time schedule, of a patient simulating a broken back injury was the feature of a demonstration of first-aid relief for all manner of major and minor injuries by the girls' team of the Portland Electric Power Company, directed by C. F. Young, safety engineer. The girls, working alternately as patient and operator, tied in quick succession and with remarkable dispatch all the bandages, trusses and tourniquets designed for first-aid relief of the more common cuts, bruises, broken bones and strains received by accident in the course of work, while Mr. Young announced each demonstration and pointed out its particular application and use. The team was composed of Oleva Murphy, Anne Inglis, Josephine Zeller, Louise Johnson and Doris Taylor.

The program concluded with a demonstration and explanation of the correct manner of applying the Schaefer prone pressure method of resuscitation by John S. Volpe, Portland Electric Power Company.



PUBLIC SPEAKING MANAGERS

(*Back row, left to right*) F. C. Carleton, Northwestern Electric Company; R. J. Vogler, The Washington Water Power Company; J. D. Orr, Idaho Power Company. (*Front row, left to right*) R. R. Easter, Portland Electric Power Company; L. M. Thompson, Puget Sound Power & Light Company; H. W. Cooper, Pacific Power & Light Company.

Public Speaking Contests Praised by Ude

Opening the third session, Thursday morning, devoted to public relations activities, W. H. Ude, director of public relations, The Washington Water Power Company, Spokane, chairman of the section, reported on the activity of each of his nine committees. He recommended that consideration be given by the incoming administration to the creation of a permanent committee on legislation and taxation to study and analyze legislative proposals and make suggestions as to needful legislation, and on matters pertaining to taxation.

Among the committees of the section having the more active work to perform during the past year, he cited the advertising and publicity committee, which was studying the most effective forms of advertising; the committee on employees' relations with the public, which had conducted an essay contest to stimulate employee interest in properly contacting the public; the public speaking committee, which had assisted in developing understanding and poise among employees through public speaking contests; and the women's committee, to which he paid a glowing tribute for its accomplishments in the last five years in developing a deeper sense of the responsibilities and opportunities of the women employees of the companies. "The women of our Northwest Geographic Division are now far more able to understand and co-operate with the present-day advance in the social, political and economic world as affecting the industry in which they are employed and the communities in which they serve," he said.

SPOKANE'S UDE

. . . public relations improved, three-minute speaking contests, essays. . .

Stating that the problems had been fully outlined by previous speakers, he asserted that public good will cannot be created by the written or spoken word—"The only way you can get the good will of the public is to earn it."

Calling attention to the over-emphasis placed on public relations work by the electrical industry, and pointing out that this emphasis had led the public to be suspicious of these activities, he urged the abolishing of public relations departments as such. "By that I don't mean that we want to do any less work with our public relations. We must have every man in our organizations sold on the idea that we must treat the public in such a manner as to gain the public's good will. But I think when we go out and continually tell the public that we are working on public relations here and we are working on public relations there, that we are building up in the minds of the public a suspicion as to why we are devoting so much of our time to public relations."

SEATTLE'S BROCKETT

. . . too much emphasis on public relations with result that public is suspicious. . .

Must Earn Public Good Will Declares Brockett

Remarkable for its brevity, punch and the potency of its message was the seven-minute speech entitled, "Comments on Public Relations," by Norwood W. Brockett, director of public relations, Puget Sound Power & Light Company, Seattle, during the Thursday morning session.

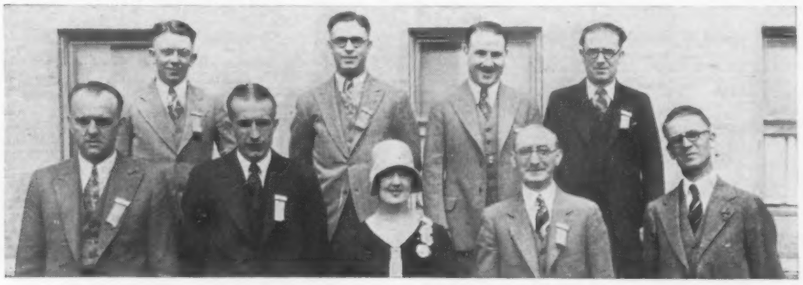
Public Speaking Contests Please Delegates

Fourteen men and one woman, winners in the two public speaking contests in their respective companies, mounted the platform in succession and delivered their three-minute speeches as a feature of the public relations session Thursday morning. Two contests had been conducted under the auspices of S. E. Skelley, Pacific Power & Light Company, Portland, chairman of the public speaking committee, who conducted this part of the program: one open to district managers on the subject, "The Public Utility a Good Citizen"; and the other, open to all other employees, on the subject, "How Can I Best Serve Our Customers?" The winner in each company contest had been awarded a company prize and a trip to the convention to compete in the finals for a first prize of $100 and a second prize of $25 offered by the association. Manuscripts and delivery were judged separately by men and women outside the industry, and the winners in each class were announced and presented with their prizes later in the session.

Speakers and results in the district managers' class were as follows: first, H. W. Cooper, Pacific Power & Light Company, second, L. M. Thompson, Puget Sound Power & Light Company, other entrants in the order of speaking being, J. D. Orr, Idaho Power Company, F. C. Carleton, Northwestern Electric Company, R. R. Easter, Portland Electric Power Company, and R. J. Vogler, The Washington Water Power Company.

In the other group the winners were, M. C. Thorn, Pacific Power & Light Company, first, and E. C. Johnson, Puget Sound Power & Light Company, second. Other speakers were: J. B. Ord, Eastern Oregon Light & Power Company; W. H. Putnam, Idaho Power Company; A. D. Miehoff, Northwestern Electric Company; G. S. Covey, The Washington Water Power Company; H. T. Shea, Mountain States Power Company; Mrs. Gladys Robison, Portland Electric Power Company, and LaVerne Hawn, The California Oregon Power Company.

Winners in two essay contests, one for women employees and one for men of the various companies, were likewise presented with prizes before the assembled audience by Mrs. Nell Laws, Puget Sound Power & Light Company, Seattle, chairman of the women's committee. Both contests were on the subject, "Pleasing Mr. and Mrs. Public," the women's being conducted by Mrs. Laws' committee, and the men's by the committee on employees' relations with the public, under the chairmanship of Col. E. LeRoy Bourne, Utah Power & Light Company, Salt Lake City. The winners were, Billie Russell, Northwestern Electric Company, and O. D. Lanning, Eastern Oregon Light & Power Company.



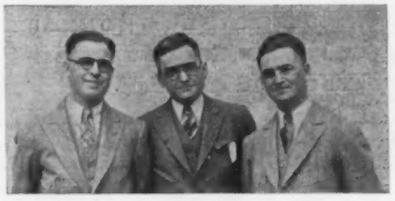
EMPLOYEE PUBLIC SPEAKERS

(*Back row, left to right*) A. D. Miehoff, Northwestern Electric Company; H. V. Shea, Mountain States Power Company; Mrs. Gladys Robison, Portland Electric Power Company; G. S. Covey, The Washington Water Power Company; E. C. Johnson, Puget Sound Power & Light Company. (*Front row, left to right*) J. B. Ord, Eastern Oregon Light & Power Company; M. C. Thorn, Pacific Power & Light Company; LaVerne Hawn, The California Oregon Power Company; W. H. Putnam, Idaho Power Company.

Playlet Depicts Attitude of Certain Newspapers

Depicting how facts can be distorted and colored to suit the policies of newspapers, a playlet with an amusing and meaty context and a pointed moral brought out in a surprise climax, was presented by Al. C. Joy, director of advertising and publicity, Great Western Power Company and San Joaquin Light & Power Corporation, and George C. Tenney, managing editor, Electrical West, both of San Francisco, assisted by Irma Shull, Puget Sound Power & Light Company, Seattle. The playlet, which was presented at the Pacific Coast Electrical Association convention at Del Monte the previous week, was fully reviewed in Electrical West, July 1, 1929, p. 14. It portrays an interview between the power company publicity man and a newspaper reporter, in which the power company man tells the true story with all cards on the table only to find later that the reporter has twisted the story into a front page sensation in his "Daily Dynamite." The climax came when, at the dropping of the curtain, the issue of the newspaper containing the sensational story was distributed to the convention audience.

The playlet was brought to the convention as an added feature after the final program had been arranged, and a place for it was provided in the public relations session Thursday morning. Its presentation in Seattle was made possible through the courtesy of the Pacific Coast Electrical Association, the Great Western Power Company, Electrical West, and George E. Hughes, president, Edison Electric Appliance Company. It was written by Mr. Joy and W. A. Cyr, associate editor, Electrical West, in collaboration.



WINNERS

Pacific Power & Light's Vice-President McArthur shows pride in his two public speaking contest winners, Thorn and Cooper.

Owens Stresses Importance of Employee Contacts

Inspiration and a bright promise for the future were contained in a stirring address by J. F. Owens, vice-president, N.E.L.A., which closed the public relations session Thursday morning. Recognition of the fact that human values are the important thing, and understanding that everything done by the industry is right only as it is right in the public interest, he asserted, were the essential factors in the solution of the problem called public relations.

Speaking directly to the rank and file of employees present, he said: "I have absolute confidence in your ability to solve any problems that may confront this industry. You have solved them in engineering, in accounting and in securing load necessary for the development of your territory. You will solve the problem of so conducting your organizations, and so conducting yourselves as individuals, that, knowing you, the folks back home with whom you live every day will know that the organization with which you are identified cannot but be clean and fine and straight, because you, Mary Brown, and you, John Smith, would not be identified with any organization that was not straight." In the actions of these employees, in the human values contained therein, he stated, lay the promise that the industry would survive all attacks.

Inspiration was imparted to his au-

dience in his eloquent portrayal of the remaking of society accomplished by the industry in the past 50 years under private initiative. He said: "When they try to tear down the system that has remade society, a system which has, in America, developed the use of 50 per cent of the electrical current of the entire world, and when they try to substitute for that system the damning one of public ownership, I feel like asking, 'Where would electricity and its benefits be today if in the past 50 years you had confined its generation and promotion to government bureaus and governmental bodies?'" The answer was shown to be that governmental bodies had contributed nothing to the development of the industry, but rather had built whatever they have on the initiative and individual effort of private enterprise.

"If all our policies are shaped with a view solely to determining by acid test whether or not those policies are in the public interest, we need not have any fear of the demagogue, of the critic, of the one who would substitute for this thing that has made America, individual initiative and enterprise, the damning thing which timeworn civilization would attempt to promulgate upon us."

Employees Are Important Factors in Winning Public Good Will Says Erb

THE development and maintenance of amicable relations between the utility company and its patrons and the public generally was shown to be of great importance in providing adequate service to consumers, in securing sufficient new capital to keep pace with growth, and in procuring the allowance of adequate rates to show a profit, in the address of George E. Erb, former chairman of the Idaho Public Utility Commission, Lewiston, Idaho, before the third general session, Thursday morning, devoted to public relations. Mr. Erb discussed in detail how amicable relations may be built up through the action of all ranks of employees from the president down.

The first consideration for a successful business he proved to be the establishment of proper relations between employer and employee, and called attention to the mutual responsibilities such relationships imposed on both. From this point he analyzed the principal problems of the employer and showed in what ways the employee could aid in their solution. In this connection he cited two main problems: first, to secure capital necessary to grow and expand with the community; second, to secure high enough rates for service to yield an adequate return on the capital invested. Since the securing of capital depends on credit, and since credit depends in part on character, he showed that the employees' part in securing capital rested in the kind of character the employees' actions gave to the company. Further, on the side of securing adequate rates, he pointed out that the opinion of the users of service, who choose the regulatory bodies that pass on rates, was a determining factor in fixing the rates allowed, and here again the employees' manner of conducting the affairs of the company was indicated as highly important in shaping this opinion.

In discussing the molding of public opinion, he named two methods of approach—through the head, by education and reasoning, and through the heart, by prompt and efficient service, courteous treatment and a sympathetic consideration of the patron's problems. Urging education of its public as one of the necessary functions of a utility company, he said: "A large percentage of the general public are prone to think their individual interests hostile or opposed to the interest of the utility. Nothing could be more erroneous. Public utility service is no longer a convenience alone; it has become a necessity of modern life and business. . . If maintained in a strong, healthy, condition it will prove a dependable servant at all times. If, however, treated in a parsimonious and niggardly manner it will result in a weakened servant rendering inefficient and unsatisfactory service, and, in times of stress will result in failure of service when most required."

The approach to amicable relations through the heart, he said, was largely a matter of the proper kind of contact with the public by employees. Enlarging on the necessity for "uniform courtesy and consideration coupled with unostentatious tact and diplomacy," he said: "What the utility wants and needs is to win public approval and public appreciation, and it is the duty of the individual employees of whatever station to make plain to the public that their utility desires the good will of the patron and will go the limit in work or co-operation for all that is for the best interests of the patron, realizing that what is the best for him is in the long run best for the utility."

Engineering Section Studies Problems of Fishways

The last session, which was held on the boat en route to Victoria and was devoted primarily to engineering, opened with a review of Engineering Section activities by D. W. Proebstel, Portland Electric Power Company, Portland, chairman. Among all the many studies made by the committees and reported at the March meeting of the section in Walla Walla, Wash., each of which was summarized for the benefit of the delegates, three subjects of particular interest to the Northwest companies stood out in the report, fishways, radio interference, and Neon gas tubes.

In the hands of J. E. Yates, Pacific Power & Light Company, Portland, chairman of the national subcommittee

ENGINEER PROEBSTEL
. . . deuces wild, seven-toed Pete, led Engineering Section through successful year. . .

on fishways, experiments looking to the ultimate solution of the fish-and-dam problem have gone forward. It had been found that the efficacy of mechanical lifts was largely dependent on the degree of success with which the movements of migratory fish could be controlled or directed, and the committee was continuing its study of such control by means of the electric fish screen.

Mr. Proebstel pointed out that increasing concern as to the interference with radio reception from high voltage lines had led the inductive co-ordination committee to study the causes and remedies of this interference on existing lines, but that as yet only a comparatively superficial knowledge of the facts had been gained. He stated that it was hoped the section might undertake an exhaustive study of the problem through experimenting on a test line built for the purpose.

The low power factor characteristic of Neon signs had led to a demand from member companies for a greater knowledge of the facts concerning this service, reported Mr. Proebstel, so that the electrical apparatus committee had undertaken a study, reporting its findings to the executive committee with recommendations as to how the power factor could be raised by equipping the signs with corrective apparatus.

He called attention to the fact that largely because of the gradually increasing cost of cedar poles, some consideration was being given by the overhead systems committee to a study of the performance of creosoted Douglas fir poles.

Use Psychology in Selling Is Speaker's Plea

Urging the application of merchandising principles based on a knowledge of psychology and human nature, A. Edwin Fein, president of Sparklets, Inc., and associate lecturer in advertising and marketing, New York University, addressed the session Friday morning held on the "Princess Patricia" en route to Victoria. He sketched briefly the fundamentals of the science of psychology and showed how the factors which actuate human decisions can be effectively played upon by the merchandiser of electric ranges and refrigerators.

Calling attention to the competition between electrical merchandise and other goods, he cited the department and chain stores as being storehouses of psychological merchandising, and pointed out ways in which electrical merchandisers could take a leaf from their books in making their advertising and selling appeals more effective through an understanding and appreciation of the factors that cause people to want to own something. The fundamental desires of love and protection of family, pride, friendship, hospitality, pleasure, appetite and life extension, could, he showed, be worked on effectively by the merchandiser of ranges and refrigerators.

Discussing what the merchandiser of ranges and refrigerators can do to appeal to the five senses of mankind in displays and advertising, he said: "It only rests with the central station to dramatize electric refrigeration and electric cooking by posing the refrigerator and range to fully exhibit the functions and complete utility of these devices rather than emphasizing their mechanics and operation. . . Tell a person what a specific article does. We are all sufficiently ambitious to want to learn how to do things." He urged the display of these devices with a full complement of accessories necessary to make them function to their fullest usefulness, likening an empty refrigerator with door ajar to a bed displayed without springs, matress, blankets and spead—a sight never witnessed in the window of a good furniture dealer. "A greater response would be forthcoming from the public," he said, "if ranges and refrigerators enjoyed the support and co-operation of the background and materials which go to make a complete picture and to tell a complete story."

Low Voltage A.C. Network Advocated by Engineer

Taking up the factors entering into the economics involved in distribution systems, with particular emphasis on the low voltage a.c. network, D. K. Blake, General Electric Company, Schenectady, addressed the Engineering Section's program on the boat en route to Victoria. He stated that the first such network was installed in Seattle in 1922, and that since then the system had been adopted by many companies until there were now approximately 1,000,000 kva. in distribution transformers connected to all such systems in existence in the country. Avoiding argument or opinion, he cited facts about the operation of the system and gave reasons why operating engineers had put it into use.

As a reason why the economics of distribution systems should be given major attention, he asserted that under the most ideal conditions investment in distribution facilities would exceed $100 per kw., and run better than 30 per cent of the total plant investment. Load density and distribution, diversity and load factors, were named as important considerations in the determination of the type of system, voltage and regulatory equipment needed to render the service. An analysis of the balance between transformers and secondaries was stated to be of importance in arriving at the most economical system.

Discussing the use of high voltages for distribution he showed them to be economical principally in serving industrial and rural areas where loads are large and widely separated, because the investment in the distribution transformer with its accessory equipment is relatively smaller than the investment in line.

The prime reason for the adoption of the low voltage a.c. network system, he said, was to take care of growing load density, and its main economy comes in from the fact that it permits a higher voltage feeder circuit, making possible the elimination of the substation from the system. One of the principal advantages of the use of the system in betterment of service, he cited as being the continuity of service it assures to small and large customers alike, precluding the necessity of installing preferred and emergency feeders. The simplicity of connecting new customers, and of repairing faults, makes it of particular advantage to the operating men.

From the customer's standpoint, he said, one of the advantages found in actual practice was the very substantial saving in floor space required on the customer's premises, which would otherwise be required for high voltage equipment, citing one case in which 1,100 sq.ft. of space was saved by a change to the network method of distribution. He discussed the effect of the system on customers' motors and suggested ways in which the problems presented could be solved.

Must Cease Corporation Baiting Says Mayor of Victoria

"I QUITE understand that it is at times a very popular policy for men in public office to take a 'tilt' at big corporations—utilities and others. I will not be a party to such a practice, neither will I allow anyone connected with me to be a party to it. It is high time that men in public office realized that capital is a very essential thing necessary for growth and development. Also it should be realized that capital can be moved from town to town and from country to country by the simple process of a bank draft, but that labor cannot be so moved. Because of the interdependence of capital and labor, and because of the importance of both to the growth and development of communities, men in public life should avoid creating discord with capital by continually hammering—mostly to create popular favor on their own accounts—for reduction of rates, oftentimes rates that are known to be ruinous, and they should be honest and frank enough to use all their energies to bring together these two great factors for national development, with the consequent security necessary to the well being of both."

HERBERT ANSCOMB, ESQ.,
His Worship, The Mayor of
Victoria, B. C.

Victoria Boat Ride Features Entertainment Program

As an addition to the customary golf, teas, receptions, balls and banquets, the principal feature of the events provided by the entertainment committee under the chairmanship of J. H. Kelly, Graybar Electric Company, Seattle, was a boat ride to the beautiful City of Victoria, B. C. Leaving at 8 a.m. Friday, the "Princess Patricia," with over 600 on board, steamed out across Puget Sound toward Vancouver Island. During the four-hour trip a short business session was held in the ship's dining saloon, while a large part of the time was available in which to enjoy the scenery of the Olympic Peninsula.

On arrival at noon a luncheon was tendered to the convention delegates in the Empress Hotel by the British Columbia Electric Railway Company, Ltd., at which A. T. Goward, vice-president, acted as official host.
trip to Seattle, leaving Victoria at 6:30 p.m., a box dinner was served on the boat, and dancing on the dack was a feature.

The annual golf tournament was played Thursday afternoon over the

course of the Sand Point Golf and Country Club, under the auspices of the golf committee, headed by E. L. Crider, Puget Sound Power & Light Company, Seattle. The Kilowatt Cup, in medal play competition among the power company members, was won by R. R. Easter, Portland Electric Power Company, Hillsboro, Ore., while R. W. Clark, Puget Sound Power & Light Company, Seattle, was runner-up. The Manning-Bowman Cup, open to all members, was played for in match play against par. It was won by T. S. Wood, American Brown Boveri Electric Corporation, Seattle.

How Can I Best Serve Our Customers?

By M. C. THORN
Pacific Power & Light Company, Heppner, Ore.

A great ruler once said, "I am the State." Similarly I may say, I am the Pacific Power & Light Company in the eyes of our customers. No institution can be any better or more efficient than the men who represent it, and because of this the attitude which any community bears toward an institution depends upon the attitude it has toward the representatives of that institution. There is an innate distrust in the minds of many people toward corporations. This is especially true of a public utility like ours, for where there is no competition there is no basis for comparison of service and very often the public expects more of the company and its representatives than is reasonable. If I, as a representative of the company, can break down this distrust by causing them to have confidence in me, I shall have overcome a great obstacle in being able to serve them best.

To serve them best, I must establish confidence in the minds of our customers toward me. I must prove to them that I am honest; that I have a sincere desire to serve them efficiently, as well as the company; that I am interested in the religious, social, and other aspects of their community life, meeting them on their own grounds, personally assisting them in their quest for greater achievements. Serving them well in their particular interests places me in a position to serve them best in my field of endeavor, and places the Pacific Power & Light Company before them as a friendly institution.

Having established their confidence in me as the company's representative, it behooves me to give the maximum of service to our customers, in order to retain that confidence. I must be thoroughly well grounded in my line of work, so that I can give definite answers to questions that arise regarding the service and the policies of our company. I must take each customer's problems to heart, putting myself in his place, so that I may see them from his point of view, thereby being better able to explain the company's position more understandingly and to arrive at a satisfactory agreement.

By giving this type of honest, courteous, prompt and efficient service to all our customers, I shall make them recognize our company as a trustworthy public servant, respected and esteemed on those grounds. Then there will be complete co-operation between our company and its customers. With this ideal situation established, I can serve our customers best and I can stand as a living example of our motto, "ALWAYS AT YOUR SERVICE."

The Public Utility — A Good Citizen

By H. W. COOPER
Pacific Power & Light Company, Lewiston, Idaho.

WE, as a public utility, enter a new field with a proper franchise to legalize our entry into business and, just as does the immigrant who for the first time sets foot upon American soil, we too must prove our permanency, our fair dealing and our ability to serve a useful purpose in the new community.

Our business is somewhat different from most others. We do not enter a community as a temporary resident but wherever we go we construct facilities of a permanent character that can never be moved away. This is our first declaration that we have selected this community as a place in which to become a citizen, not for just a day but for all time. We send our personal representatives into each community to live and become a part of its citizenship and to participate in advancing all worthy community enterprises.

We do not give one character of service to big cities and a different character to small towns, but link them all together and place at the disposal of every community, however small, the facilities of the entire system. We serve rich and poor alike with the same quality and adequacy of service and at the same rates. No matter how prosperous may be the community, our share is limited. We exact no exorbitant profits for we can earn only a reasonable rate of return upon the value of property devoted to service.

Our first entry into the home is just the beginning of our effort to make our service an intimately useful part of living in that household. Nor do we stop here. We constantly strive to extend the use of this service to the end that much of drudgery is forever banished.

Now, therefore, with all of these attributes of citizenship at our command, let us so apply them and so conduct our business that when the test is made we shall be judged a good citizen.

M. L. Hibbard Is Elected New President

M. L. Hibbard, vice-president and general manager, Idaho Power Company, Boise, was elected president of the association for the coming year at the executive session held Friday morning on the boat en route to Victoria. Other officers elected were: vice-president—M. W. Birkett, vice-president and general manager, The Washington Water Power Company, Spokane; vice-president for Idaho—R. B. King, Idaho Power Company, Boise; vice-president for Montana—W. B. McDonald, Mountain States Power Company, Kalispell; vice-president for Oregon—J. P. Lottridge, Eastern Oregon Light & Power Company, Baker; vice-president for Utah—P. M. Parry, Utah Power & Light Company, Salt Lake City; vice-president for Washington—L. R. Coffin, Puget Sound Power & Light Company, Wenatchee. In addition two members at large of the executive committee were elected to fill expiring terms: representing the central stations, A. C. McMicken, Portland Electric Power Company, Portland; and representing the jobbers, J. I. Colwell, Graybar Electric Company, Seattle.

Hold-over terms on the executive committee are held by W. W. Briggs, Grays Harbor Railway & Light Company, Aberdeen; and A. S. Moody, General Electric Company, Portland. All the above, with the retiring president, R. M. Boykin, Puget Sound Power & Light Company, Seattle, and the four section chairmen appointed for the coming year, will constitute the new executive committee.

Before the end of the session the following appointments were announced by Mr. Hibbard: chairman Accounting Section—M. J. Wilkinson, Pacific Power & Light Company, Portland; chairman Commercial Section—J. F. Orr, Utah Power & Light Company, Ogden; chairman Engineering Section—D. W. Proebstel, Portland Electric Power Company, Portland; chairman Public Relations Section—W. H. Ude, The Washington Water Power Company, Spokane; and treasurer—A. E. Janssen, Idaho Power Company, Boise. Acceptances from all these appointees had not been received at the end of the convention.

Highway Lighting Installation
for the San Francisco Bay Toll Bridge

By **W. P. Bear**
Street and Airport Lighting Sales Engineer, Pacific Gas and Electric Co., San Francisco

THE San Francisco Bay Toll Bridge is a new vehicular concrete and steel construction roadway laid across San Francisco Bay at Little Coyote Point starting at a point near Mt. Eden on the east shore and terminating in a considerable length of specially constructed highway east of and near San Mateo, Calif., on the west shore. Approximately 12 miles (62,983 ft.) of highway and bridge length is involved. A total of 266 400-cp. lighting units now in place accomplish a very high class job of highway lighting.

The main bridge structure over the bay is 37,183 ft. in length and consists of 1,169 pre-cast concrete spans. Of this length 1,503 ft. includes the five steel approach and lift spans over the main channel; otherwise the construction is similar to the general design of a causeway.

There is a low concrete bridge, 943 ft. long, crossing over Seal Creek. This short bridge is at about the center of the western roadway approach and does not contain any lift span or overhead steel construction.

The roadway of the main and Seal Creek bridges is 27 ft. wide; the pre-cast concrete spans are 30 ft. long. The roadway is protected by a concrete railing, 4 ft. 6 in. high, with concrete railing posts 5 ft. high placed every 30 ft. along the edge of the bridge. A toll gatehouse, including a gasoline filling station and a restaurant is located at the west end of the main bridge.

The east- and west-end roadway approaches involve a total of 24,857 ft., of which 15,457 ft. is in the west approach. The roadway was built by the bridge company and consists of earth grade about 6 to 8 ft. above terrain. The concrete roadway is 27 ft. wide with a gravel surfaced dirt shoulder about 8 ft. wide on either side. It is fenced on either side with wood posts and wire netting, all painted white, and on one side of the roadway there is now in place a line of 40-ft. wood poles which carry one 6-pin crossarm and 4 wires for power and light and two additional wires for a street lighting circuit. The telephone company occupies space on a separate crossarm. The pole line clears the concrete road surface by about 3 ft. The wire netting fence, above referred to, runs between the pole line and the edge of the roadway. The concrete surface of the roadway and bridge space is very light in color.

The lighting of the main bridge consists of 172 400-cp. Union Metal electroliers with General Electric tops. They are set staggered and spaced 210 ft. (7 bays) apart along the roadway. The posts are of laminated steel construction. They are 12 in. in diameter at the base, the shaft is 5½ in. in diameter at the bottom, 4 in. in diameter at the top and 8 ft. high, plus 5 ft. of concrete bridge post, making the total height 14 ft. 9-in. to light center. The top is Novalux form 13 casing with 127-1,127 glassware without refractors.

The electrolier units are supplied from a 6.6-amp. series circuit through a 4,000 - 6,000 lumens primary by 20-amp. secondary series transformers. The transformers are mounted just below the electroliers, on the top of the headpiece of the bent, and, being thus exposed to salt air, have been constructed with copper-clad casings. The electrical supply to the electroliers consists of No. 6 flexible copper wire in 3,500-volt rubber insulation, with an outer braid of "flexduct" or similar material. The wire is supported under the edge of the bridge deck on large porcelain strain insulators held in galvanized flatiron supports. The four trussed steel stationary spans and the one trussed steel lift span, with a total length of 1,503 ft., are lighted by eight bracket units of 400 cp. each.

The highway lighting consists of 81 General Electric 45-L pendant units with bowl refractors and outside feed wire connections supported on 4-ft. ornamental pipe brackets mounted on 45-ft. poles set 3 ft. off the

A section of the west roadway showing service line and highway lighting units.

A section of the main bridge showing electroliers set staggered on 210-ft. spacing.

roadway surface. The lighting units are about 30 ft. above the road surface, and spaced 300 ft. apart and all on the same side of the roadway. The lamps in these units are 400-cp., 6.6-amp. series in candescent type.

The refractors are Holophane No. 4,173 highway type with rippled outer surface to diffuse the light. They are designed for B-symmetric distribution. These lighting units are supplied with service through No. 6 bare copper wire supported on the pole line along the highway.

The toll gatehouse is located in a spacious paved area at the west end of the bridge. It contains administration offices, collection stands, scales and rest rooms for men and women. Also, there is a filling station and restaurant. These premises are all well lighted. The main arch supports an illuminated sign, the tollhouse is floodlighted by eight 250-watt incandescent units and the restaurant, restrooms, etc., contain electric heat.

The center span is a counter-balanced vertical-lift type steel structure and is operated by electric motors with auxiliary gas engine drive. The locking and signal devices are motor operated.

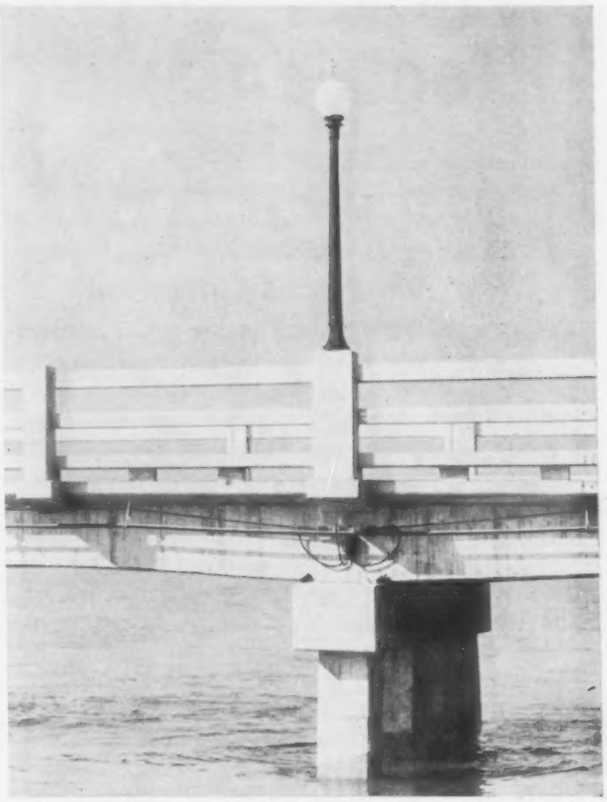
The lengths of roadway sections and types of lighting are as follows:

Portion	Feet	Lighting Units	Cp.
West approach	15,457	49 pendants	400
Seal Creek bridge	943	5 electroliers	400
Bay concrete bridge	35,680	172 electroliers	400
Five bay steel spans	1,503	8 brackets	400
East approach	9,400	32 pendants	400
Total	62,983	266 units	

Total 177 electroliers and 81 pendants plus 8 brackets on spans.

The connected load of highway and miscellaneous lighting, heating and power is as follows:

Approaching the center lift span of the new bridge. Electric motors operate the lift span.



Electrolier showing method of supplying current and mounting transformer in special copper-clad casing to resist corrosive action of the salt air.

	Watts	
Signal lights eight 60-watt	480	
Roof sign lighting	620	
Floodlighting eight 250-watt	2,000	
Miscellaneous lighting	5,800	
Heating load	7,000	
Power for lifts, signals and compressor	25,000	
Highway lighting system, 266 units	66,500	
Commercial load, filling station, restaurant and two Richfield signs on towers	10,000	
Total connected load	117,400	(117.4 kw.)

Substation Equipment

Three locations for transformers, meters and switching equipment are provided. The utility company supplied all substation equipment in locations and on platforms or in room space provided by the owner. The series lighting for the east end of the bridge and approach is supplied from a 10-kva. and a 30-kva. constant current transformer placed on a platform at the east bridgehead. The power and lighting for the lift span are supplied from a bank of one 25-kva. and two 15-kva. transformers set on a steel platform in the superstructure of the stationary steel span near the lift. The power and all lighting for the west end of the bridge, the west approach, the toll gatehouse, electric heat and floodlighting are supplied from a substation in one of the tollhouse rooms which has been fireproofed for the purpose. The service meters and the time switches for the control of highway lighting and floodlighting are in this substation.

The cost of the electric lighting and power equipment in place was slightly under $50,000 and the installation was made by the Latourette-Fical Company of Sacramento. The series circuit for highway lighting is supported on the utility company's poles. The substation and switching equipment was provided by the utility. The electric service is supplied by the Pacific Gas and Electric Company.

Electrical West

C. T. Hutchinson, *Editorial Director*
G. C. Tenney, *Managing Editor*

Producing Electricity Is a Commercial Enterprise

"OVER-EMPHASIS of our public relations problems is helping to make the public suspicious of our acts," said an executive in an address at the Northwest Electric Light and Power Association convention. "I should like to see a reaction, and a strong one, from sentimentality and back-slapping uplift," wrote another executive in a recent issue of a contemporary journal. Such statements sound revolutionary in the light of old policies and practice. In view of the findings in the Federal Trade Commission investigation, however, they are only normal reactions to the maudlin tones of paternalism, self-glorification, benevolence, apology and abstract idealism that were wont to echo in public addresses, writings, advertisements and publicity whenever power companies were involved.

We submit that this distinct change in attitude is a healthy sign. The day has passed when the power company executive can sit back and think that his is a great philanthropic organization, the soul and life blood of the community. Gone is the day when he can go out and make an audience believe that such is the case.

The day has arrived for cutting out red tape; for simplifying rate structures; for minimizing accounting nuisances; for expeditiously handling all complaints; and finally for convincing the public that the light and power business is a commercial enterprise which seeks a fair profit on the service it renders.

Boulder Dam Bill Is Now a Law

ULTIMATE development of the Colorado River is closer to reality today than it has been for the past decade. President Hoover has proclaimed the Boulder Dam Project Act a law, since it has been ratified by six of the seven states concerned within the requisite six months. Secretary Wilbur has announced that it will be the government's policy to sell falling water at the dam rather than to construct and operate the power plant itself.

The result has been a series of conferences between government officials and representatives of California light and power interests which have assured a market for the power that will be produced. Thus the proportion of the $165,000,000 estimated cost of the project which must be guaranteed to the government over a 50-year period has been reduced to approximately $70,000,000 (deducting $39,000,000 for the All-American canal, $25,000,000 as the government's contribution to flood control and $31,000,000 as the cost of the power plants). This assurance on the part of the California utilities is sufficient grounds for the government to hasten the other preliminaries to actual construction.

There is one uncertainty in the present situation —Arizona. Pending a satisfactory distribution of the waters allocated to the lower basin states, Arizona has steadfastly refused to ratify the Colorado River Compact. Unless Arizona feels that her rights are suitably protected she threatens to carry the matter to the courts. This may or may not be a long tedious case. The one ray of hope lies in the resumption of negotiations between California, Nevada and Arizona in October. Should these be successful, southern California may be using Colorado River power by 1935. Otherwise it may be 1950.

Death Takes S. M. Kennedy, Advocate of Public Relations

THE sudden passing of Samuel Macaw Kennedy, former vice-president of the Southern California Edison Company, brings to a close the career of one of the electrical industry's greatest public relations advocates. To Mr. Kennedy goes the credit for enunciating the great truth that sound public relations is a matter of individual contacts; that the good will of an industry or a company rests on the relationship between individual employees and individual customers. He was among the first to expound the theory that the making of one enemy could undo the work of making hundreds of friends. The entire present-day theory of sound public relations is based upon the precepts set down by him almost a decade ago.

A close student of psychology, Mr. Kennedy combined keen business intelligence with the fruits of his studies, with the result that national recognition was accorded his philosophy of business and public relationships. A staunch believer in the principle of the Golden Rule in his own life, he applied this great fundamental truth to his business with marked success.

Samuel M. Kennedy will long be remembered by the electrical industry for crystallizing and passing on his practical wisdom in the winning and keeping of public good will.

Food Preservation Program Deserves Active Support

SEPTEMBER has been set aside as National Food Preservation Month. A program has been outlined and endorsed by practically every agency concerned with food preservation. It has been recommended by more than a dozen national organizations ranging from the Bureau of Home Economics of the U.S. Department of Agriculture to the American Bottlers of Carbonated Beverages.

The program purposes to sell to the American public these four major thoughts: (1) the relationship between health and food spoilage; (2) the vital necessity for purposes of health of keeping perishable foods below 50 degrees; (3) the causes of food decay and bacteria growth; and (4) the vital need for proper all year refrigeration. For this purpose interested manufacturers have raised a fund in excess of $200,000 for a national advertising and publicity campaign.

Obviously the success of the program will rest to a large degree in the measure of local support that is given it. Since the campaign will lay the groundwork for future electric refrigeration merchandising, the central stations and refrigerator dealers in particular and the electrical industry in general should assume the leadership in each local community. With the excellent plan book that has been provided this should not prove a difficult task.

William Baurhyte, Industry Leader, Passes

IN the passing of William Baurhyte, former president of the Los Angeles Gas and Electric Corporation, the West loses one of the central figures of the electrical industry. The story of his career—forty-five years in the public utility business—offers a valuable lesson, as well as further evidence, if indeed any were needed, that the combination of industry, an upright sterling character and a sympathetic feeling for one's fellow men inevitably produce what in life is regarded as success. Many have the first two, but the addition of the third is sufficiently rare to warrant the opinion that the human side of William Baurhyte will be the one by which he will be held in memory by his many friends when his more material achievements shall have been forgotten.

Let him be remembered by a quotation from his message to his associates upon his retirement: "It is recess time, and I want to go out to play . . . . When I have had enough of the highways and strange places I shall turn my face homeward to rest . . . . "

Talking Movies Promise Much for Conventions

TALKING motion pictures promise to revolutionize convention procedure, particularly in the case of geographic division meetings of the National Electric Light Association. The possibilities of this latest combination of photography, radio and light were brought out at the Del Monte convention of the Pacific Coast Electrical Association and the Seattle sessions of the Northwest Electric Light and Power Association. Such world figures and leaders in the industry as President-elect Sloan, Edison, and Sir Ernest Benn, were heard in stirring messages with none of their personality or forcefulness lost.

The possibilities of the talking motion picture are almost unlimited. No longer are leaders in the industry handicapped by location or press of business in taking their messages to the rank and file. Their speeches and other outstanding parts of any convention may be recorded and carried to all parts of the country, shown before any group or audience, and heard a month or ten years after the actual occurrence. Thus advantage may be taken of one of the latest marvels of the age in which we live.

Franked Literature for Public Ownership Propaganda

THE twelfth annual report of the Public Ownership League of America states: " . . arrangements have been made with United States Senator Norris for securing large quantities of his addresses in the Senate dealing with public ownership . . . . These reprints of Senator Norris' speeches are in franked envelopes so that they may be used to great advantage throughout the country in connection with municipal ownership campaigns where these questions are at issue. This constitutes a new feature of the educational work of the league which is very valuable because it enables us at a very small cost to reach every voter in a community."

If the United States Senate is so interested in the "propaganda" activities of the electric light and power utilities as to demand a Federal Trade Commission investigation, then it would seem that the hundreds of thousands of security holders in the utilities are entitled to an investigation and explanation of the relationship existing between Senator Norris and the Public Ownership League. Fortunately the use of franked literature is not one of the "crimes" laid at the door of the power industry.

Engineering Practice

X-Frame Line Structures Carry Electric Service Into Lightly Loaded Rural Areas

By D. S. Young, Manager, Young Electric Company, Sherwood, Oregon.

WITH four lighting customers per mile of line as a system average, the economic problems of rural electrification are brought forcibly to attention. In the small rural territory southwest of Portland, Ore., served by the Young Electric Company (a subsidiary of the Portland Electric Power Company), the average of four customers per mile includes one village wherein there are 25 customers within one mile of line. Without this village the system averages but three customers per mile and some of the lines operate at less than that number. This condition, coupled with a demand for electricity upon the part of the farmers in the neighborhood and a desire to serve electricity to all that possibly could be reached within economic limits, brought about the development of the X-frame construction briefly described in Electrical West for June 1, 1927, p. 469.

Much of the original system was built of standard poles, but as these reached the end of their useful service life, experience showed that it was necessary to replace them with lighter structures, easier and cheaper to build and less costly to maintain.

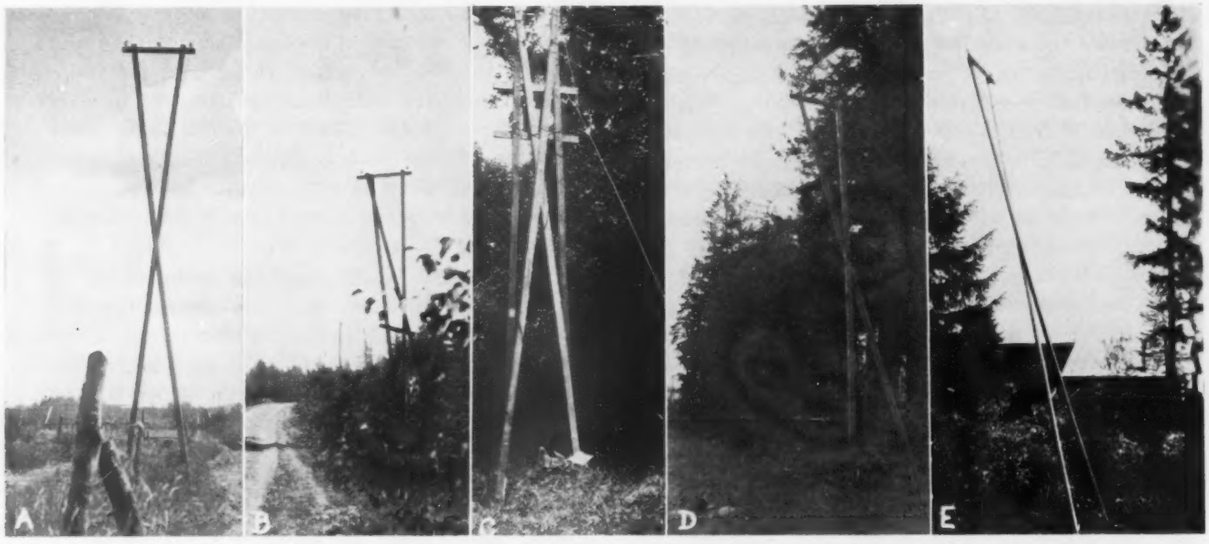
The X-frame of course still is the distinguishing feature, but the height of the frame has been increased from 20 to 26 ft., the crossarm has been raised to the top of the structure, using 3 x 4-in. timbers 5 ft. 6 in. in length instead of 2 x 4s for crossarms; standard conductor size has been increased from No. 8 to No. 6 copper, and it now is standard practice to include a "breaker" in the line at one end of a dead-end run or on a floating structure in the middle of the run as will be described later on. Anchor frames or dead-ends are made of 3 x 4s instead of 2 x 4s and this type of structure is used also at all road crossings and at intervals in the line not to exceed one-half mile. Transformer structures also are made of 3 x 4s and both anchor structures and transformer structures are guyed both ways for rigidity.

Method of Erection

The main timbers are bolted together near the center, the crossarm is bolted at the top, and the X-frame itself is mounted by means of ⅝-in. bolts to 1-in. pipe sections embedded in pyramidal concrete foundation blocks. Lumber cut to the proper length is delivered direct from the mill to the pole location with a light truck which also hauls wire, bolts, tools and the two-man line crew. Dead-end structures are erected first and then the conductors are strung out along the ground and stretched fairly tight. Erection of the intermediate structures themselves begins at the end of the line opposite to the dead-end.

While one man of the crew builds the X-frame structure and mounts pins and insulators the other sets the foundation blocks, marking the length of the X-frame to correspond to ground contours and to location of foundation blocks so that one leg of the structure may be cut to suit. The second man also places a marker on the conductors at the proper point to facilitate tying-in the conductors while the structures are on the ground.

After the X-frame legs have been sawed to fit the ground contour and bored to accommodate the foundation bolts in each leg, the frame is laid on its edge with its base adjacent to the foundation blocks and its top in the roadway. The line wires next are tied to the insulators while the pole is down, utilizing the previously placed marker



Light structures that have met service requirements and proved themselves to be substantial. (A) A tangent section; 3-wire service. (B) Angle construction. (C) Transformer and service take-off structure. (D) A tree down across the line fails to pull down adjacent structure and does not break conductors. (E) Hinge action of structure enables slack provided by "breaker" to be carried to point where tree is down across line, obviating serious damage.

to determine the proper tie-in point on the wire. The frame then is raised by means of pike poles and bolted to the foundation supports and the foundation blocks are trued and tamped solidly in place.

After the last intermediate frame is raised, the excess slack is pulled out of

Foundation blocks are pre-cast and hauled to the job.

the line and the line is tied in at the dead-end. This scheme of erection eliminates all climbing except at the dead-end point, and there a light extension ladder is used. Two men will construct an average of a half-mile of line per day under favorable conditions, after the holes have been dug and the material delivered along the line.

Advantages

Tests and service conditions have proved the line to be stable. The line itself of course holds the frames vertical in the longitudinal direction, and since each structure has been cut to fit the ground contour, the structure stands plumb in a transverse direction. The use of two foundation blocks increases its stability in a transverse direction, actual tests showing that it takes more than a 20-mile cross wind to compensate for the weight of the X-frame and a span of wire. An ice load actually increases the line's stability because of the added weight. The use of an extra side brace on angle frames as illustrated in some of the accompanying illustrations or the use of a guy wire from the top to the bottom of these frames has practically eliminated the necessity of using any cross-road guys.

Since the structures are mounted to their foundation pipes by means of a single bolt at the base of each leg, a hinge effect is produced in the direction of the line. This is an advantage not only in construction where flexibility is of material assistance, but also assures that in case of possible line failure the structures will fall within their own right-of-way and not across the road, and further, that they will fall without breaking. Because of the line's flexibility there has been but one case of failure in operation in the entire history of this kind of construction and in that case four poles went down. Repair was simple, however, since the wires were spliced on the ground, tied in and the frames raised with no climbing. On one occasion during construction an anchor gave way and let down about a half mile of line, but there was no breakage of frames, wires or insulators, and the two-man crew rebuilt the entire length of line in two and a half hours.

In the six years that this type of construction has been used there have been several breaks caused by trees or limbs falling on or across the lines. These unusual strains, however, never have caused more damage than to break the conductor at an adjacent weak point, and such breaks are as easy to repair with X-frame construction as with any other type of construction.

"Breakers"

To control as far as possible the matter of line breaks there has been developed a type of "breaker" arrangement that can be installed at dead ends or at any other desirable point. This device is designed to constitute a definite "weak point" in the line so that unusual strains occurring in the line will be transferred to the nearest "weak point." Thus, if a tree falls across the conductor the nearest breaker will give way, opening the circuit, and through the hinge action of the structure the entire section of line will be allowed to fall a sufficient distance to furnish the slack necessary to permit the conductors to be pulled to the ground at the point where the tree has fallen, but will not pull the structure down flat. Clearing such a case of truble then becomes simplified since it is necessary only to cut away the tree and then go to the breaker which gave way to pull up the line to its original position and retie the breaker.

The breaker itself is composed of four elements: (1) line strain insulators suspended 1½ ft. away from the crossarm; (2) a "breaker wire" which is a size smaller than the conductor and which is looped between the line strain insulators and strain spools bolted to the arm, thus carrying the strain of the conductor pull; (3) a "stop cable" of ¼-in. guy cable, each end of which is fastened through the same eyes in the line strain insulators as is the "breaker wire" and which also is looped through the strain spools or through the upright supports of the X-frame itself. This stop cable is long enough to provide 6 or 8 ft. of slack upon breakage of the breaker wire, thus permitting the entire line of frames to fall over this distance but not permitting them to go flat; (4) jumper wires the same size as the conductors extending from the conductors at a point beyond the line strain insulators to a pin insulator on top of the crossarm, but cut and spliced with untwisted sleeves to permit the ends of the jumper to pull out of the sleeves and thus open the circuit, if, as and when the breaker wire gives way, permitting the adjacent frames to fall over to the limits allowed by the sunken cable.

This somewhat peculiar device has operated most successfully in service and is being installed in all new construction.

Cost, Strength and Safety

Under standard Oregon weight and scales the cost of a two-wire primary line of No. 6 copper is about $350 per mile. This same cost formerly prevailed for a line of No. 8 copper, but efficiencies in construction and improvement in design, including higher structures and consequently fewer required structures, simplification in the process of manufacturing concrete bases, and a general increased efficiency in construction, offset the added copper cost. Improvement in materials used and in construction standards has been such that the labor cost now represents only 11 per cent of the total cost. Also, that part of the value of the line which is subject to rot or to fire hazard is only about 13 per cent. Transformer installations and secondary runs cost about the same as other classes of construction.

As to strength and safety, numerous field tests have shown to the satisfaction of the engineers of the Pacific Telephone and Telegraph Company, whose main pole lead between Portland and San Francisco is crossed by one of these lines, and to engineers of the Public Service Commission of Oregon, that the X-pole structure is safe and that construction requirements as prescribed by the commission and contained in the National Safety Code relating to rural construction, are met. Elimination of cross-road guys, reduction in the weight of wire supports, the hinging of the base so that the line must fall in its own right-of-way if it falls at all, and the use of "breakers" to open the circuit and hold the line up off the ground in cases of severe trouble, are important factors of safety, particularly for this class of service. From the standpoint of labor safety, the elimination of more than three-quarters of the climbing and the use of the line wires to hold the support while it is being raised also have reduced the hazard of line work.

The Portland Electric Power Company and its subsidiaries, of which the Young Electric Company is one, has more than 20 miles of X-construction in operation at the present time, carrying voltages up to 2.3 kv. Its low first cost and correspondingly low maintenance cost have made it possible to take on business that otherwise could not have been secured and its use on side roads in sparsely populated areas makes economically possible the construction of heavier lines along the main road.

X-construction is patented in the United States and patents are pending in Canada and other countries.

Window Washing—Dirt accumulation upon windows and skylights seriously reduces the lighting efficiency of such openings. The matter of exterior cleaning, however, often involves relatively high cost because of inaccessibility, and as a result the important job of proper window washing is passed by without further thought. Authorities have determined experimentally that three inside and one outside washings during the course of a year's time will result in greater light efficiency than will two complete inside and outside washings.

Fundamentals of Correct Metering—I

A Discussion of Blondel's Theorem and an Introduction to Its Use as a Criterion of Correct Metering

By E. C. GOODALE, Tacoma, Washington.

BLONDEL'S THEOREM states in effect that:

> In an interconnected system of any number of conductors connecting any source of electric energy with its load the power passing over these conductors to the load may be measured (at any place in the system between source and load) by the use of one less meter than there are conductors.

This rule holds true regardless of the nature of the electric energy, whether it be d.c. single phase or multi-phase, provided, of course, that the meters used are correct for the particular frequency, voltage and current applied to or passing through them. In other words, any kind of system may be metered in accordance with Blondel's theorem provided the meters are used at their proper ratings. This theorem further states that the correct way in which to meter such a system is to select any one of the conductors as a "common wire." Then there should be a meter current coil in each of the other conductors and a voltage coil connected from each of these conductors to the common wire. Thus each of the conductors except the common passes its current through a meter, the voltage coil of which is energized by a voltage from the conductor in question to the common conductor.

This theorem is the criterion of correct metering and will be found to be the "general law" of which the various metering schemes in practice are special cases or "short cuts." The "short cuts" sometimes allow the use of fewer meters, but register correctly only under balanced conditions. For example, the three-phase four-wire method of metering, using but two voltage elements (although three current elements) is a short cut which gives correct metering provided the voltages are balanced, or provided the vector sum of the two in use is equal, but opposite, to the third which should be used in order to comply with Blondel's theorem. It will be found that most of the metering connections in practice which do not apparently agree with this theorem simply are special cases made possible because of special conditions.

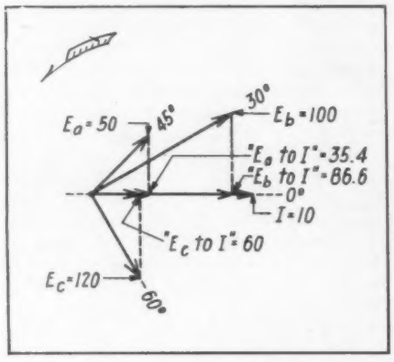


Fig. 1A. "Power components" of voltages with respect to a common current as shown vectorially.

Another example is the single-phase three-wire method of metering. According to Blondel's theorem, two meters are necessary, while in actual practice only one meter is used, a three-wire meter. This three-wire meter, however, is a specially designed meter having a "two-in-one" feature, two current coils and only one voltage coil. The voltage coil takes full line voltage and the torque from the current coils is their average, not their sum. This meter registers correctly provided the line-to-neutral voltages are equal.

These metering short cuts are advantageous in many cases. Blondel's theorem, however, holds for all cases and is the standard to which any metering connections may be referred. If a metering scheme gives the equivalent of what would be obtained by the use of this theorem, then it is correct (subject only to its own limitations), otherwise it is incorrect.

Of course meter elements may be used in place of separate meters, as in the case of the polyphase meters in general use on power circuits. Also the use of current and potential transformers in no way changes the applicability of Blondel's theorem.

In order to follow out a little more closely the way in which Blondel's theorem operates, the following discussion is accompanied by numerous illustrations and vector diagrams. At first glance these diagrams may look complicated and the first inclination of the reader, unless he be a "connoisseur" of vector diagrams, will be to make a hasty perusal of the whole mass and let the matter drop there. The reason for all these diagrams, however, is to show how this theorem works under any conditions of unbalanced loads or of source voltages, and with any number of conductors. The illustrations from Fig. 5 on show how such a system is metered. Badly balanced conditions are assumed and five conductors are taken to be the number connecting source to load.

It may be noted that Kirchoff's laws are brought in constantly in order to determine unknown quantities and that they form a standard to which this system as well as any system must conform if it is to represent a possible case. For instance, one could not arbitrarily choose five line voltages of any phase positions and any size to represent an actual system. An actual system may be unbalanced as to source voltages, as to load currents, or as to load power factors, and yet it must conform in every particular with Kirchoff's voltage and current laws as well as with the other more commonly used Ohm's law. For this reason it is not possible to make offhand assumption of all voltages or line currents. As many as possible are assumed and the rest determined. In the case of an actual circuit, once the truth of Blondel's theorem is known, it is unnecessary to know the values and phases of all these voltages and currents, but to prove the truth of the theorem it is necessary to know the values and phases of all the factors in the system.

Before taking up the more complicated case of five conductors it may be well first to make a preliminary study

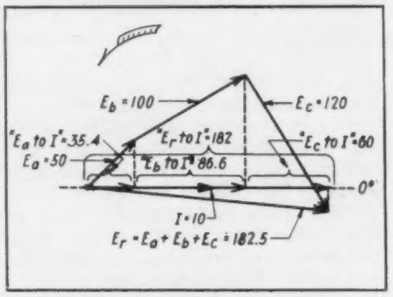


Fig. 1B. Vector polygon showing vectorial addition. Note that ("E_a to I") + ("E_b to I") + ("E_c to I") = "($E_a + E_b + E_c$) to I".

of the factors underlying this theorem. There are two basic truths which together constitute the key to the proof of the truth of Blondel's theorem. These are:

> (*a*) The sum (or difference) of the power components of two or more voltages with respect to a common current is equal to the power component of their vector sum (or difference) with respect to this current.
> (*b*) The sum (or difference) of the power components of two or more currents with respect to a common voltage is equal to the power component of their vector sum (or difference) with respect to this voltage.

Upon these twin facts rests the proof that mesh loads will register correctly and the reason why star loads will register correctly when connected in accordance with Blondel's theorem.

Fig. 1A is a vector diagram of a current I which is assumed as common to the three voltages, E_a, E_b and E_c, the phase relations of which are as shown. Just as the power component of a current with respect to a voltage is determined by projecting the current vector onto the line representing the voltage vector, in the same way the power component of the voltage with respect to the current may be found by projecting the voltage vector onto the line representing the current vector. When a current and a voltage interact in a meter the resulting torque is proportional to the product of either multiplied by the power component of the other with respect to it. Hence it is just as correct to multiply the current by the power component of the voltage with respect to that current, to determine the power passing through the meter, as it is to multiply the voltage by the power component of the current with respect to that voltage.

In Fig. 1A voltage E_a ($=50$) leads current I ($=10$) by 45 deg. This gives a power component with respect to I equivalent to 35.4 volts, which multiplied by I ($=10$) gives 354 watts. Similarly E_b gives 866 watts, and E_c 600 watts, the total of $I \times$ ("E_a to I") $+ I \times$ ("E_b to I") $+ I \times$ ("E_c to I") being $354 + 866 + 600 = 1{,}820$ watts.

The vector resultant of the three voltages, $E_a + E_b + E_c$, is E_r which is equal to 182.5 volts lagging I by 5 deg. Now, the power component of E_r with respect to I will be found to be identical to the sum of the power components of the voltages going to make it up. This

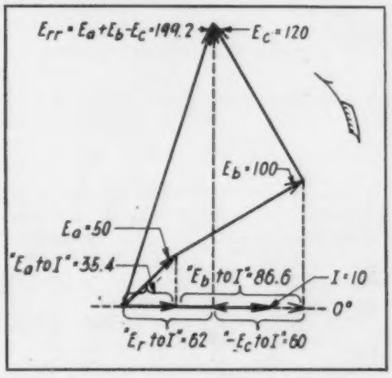


Fig. 1C. Vector polygon showing vectorial subtraction. Note that ("E_a to I") + ("E_b to I") — ("E_c to I") = ("$E_a + E_b - E_c$) to I".

power component is 182 volts which, multiplied by the current I, gives 1,820 watts. The vector addition of the three voltages and their power components are shown in the vector polygon of Fig. 1B.

In Fig. 1C are shown the conditions existing if E_c be subtracted instead of added. Its vector simply is reversed and then added in the regular "heel-and-toe" manner shown, the resultant voltage being $E_{rr} = 199.2$ volts leading I by 112 deg. Since the slope of this reversed vector is at an angle greater than 90 deg. (plus or minus) with respect to I it will give a negative power component, decreasing the total power registered by the same amount that it would increase it under the conditions of Fig. 1B. The total in this case amounts to $354 + 866 - 600 = 620$ watts.

It may be observed also how the power component of the resultant, E_{rr}, in this case is 62 volts hence giving a total of $62 \times 10 = 620$ watts. It is apparent, therefore, that regardless of the number or phase relations of a set of voltages which may be energizing a set of meters all passing the same current, the sum of their registrations would be equal to the registration of a meter energized by the vector resultant of these voltages and passing the same current. In Blondel's theorem we are concerned with two or more such voltages at a time, in proving out the correctness of metering whatever loads are connected to the system. The current to each of the mesh loads passes in a forward direction through one meter and in a backward direction through another. This current therefore is common to both meters, only the voltages on each being different. This will be taken up in detail later in this series.

EDITOR'S NOTE: This is the first of a series or four articles by the author discussing the application of Blondel's theorem to various metering problems and giving an explanation of certain basic underlying principles. The next article will appear in an early issue of ELECTRICAL WEST.

Antique Equipment Sought

Henry Ford is collecting antique electrical equipment. He has acquired a number of ancient engines, dynamos and motors which will be housed in the Ford museum to be built on 125 acres near the present Ford laboratories at Dearborn, Mich.

Anyone who has any antique electrical equipment or who knows where any may be obtained is requested to communicate with James W. Bishop, Detroit Edison Company, 2000 Second Ave., Detroit, Mich.

Turbine Nozzles Cleared of Scale With Hot Water

In a plant of the El Paso Electric Company the efficiency of a 15,000-kw. turbine generator unit was impaired to the extent of several thousand kilowatts by the presence of scale which had plugged some of the nozzles. The first time the turbine was taken down to repair this difficulty 59 hours of continuous work was necessary before the turbine could be placed back in service. At that time analysis of this scale showed it to be largely salt and soluble in water.

About two months later scale had re-formed in the machine to such an extent that it would carry only two-thirds of its rated capacity. A new method of correction was tried at this time and found to be very satisfactory. A flange on the steam chest was removed and a pipe line run from the boiler feed-water pump to the turbine at that point. Water at 205 deg. F. and 250 lb. pressure was pumped through each of the ten valve openings for from 10 to 25 min., dissolving the scale.

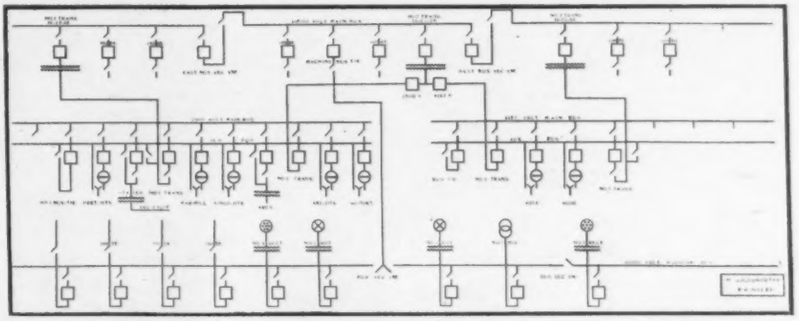
Every precaution was taken to avoid possible damage to the turbine through this process of cleaning the steam channels. The station crane was used to keep the turbine turning slowly to maintain an even temperature and provision was made to drain water from the first and third stages to prevent possible blade warping from an accumulation of water.

This method of washing the scale from the steam channels of the turbine resulted in a saving of about $500 as compared with the take-down method first used. Analysis of the difficulty indicated that certain chemicals used in treating the water may have caused the formation of the scale. The treatment has been changed with the expectation that the trouble may be eliminated.

Large Wiring Diagram Helps Substation Operators

The impermanence of blue prints even at their best led H. Goldsworthy, chief operator at the Jefferson substation of the Portland (Ore.) Electric Power Company and his assistant, R. R. Myers, to seek a more stable means of picturing the wiring and switching at their station to facilitate prompt, accurate and safe operation. The first experiment was a large-scale diagram chalked on the wall of the station. Recognizing the value of the idea, officials of the company urged that the diagram be reproduced in a more decorative and utilitarian form. The result is illustrated herewith, a diagram done in black and red paint on white-painted beaverboard set in a varnished wood frame and hung against the wall in plain sight of the operator's desk.

The diagram is 4 ft. wide and 10 ft. long and mounted in a 3-in. frame. The 11-kv. buses and equipment are in red with the lower voltages in black. Drawn with great care and in ample space, it can be read easily from some distance. Good natural light reaches it in the daytime and special lighting is to be provided for it at night. The drawing is simple and clear, permitting every switching order to be visualized at a glance and thus greatly diminishing the chances of error. It is a valuable aid in increasing the confidence of new or strange operators not thoroughly familiar with the station and who may be called upon from time to time to take a shift in emergency.



A 4 x 10-ft. single-line diagram of substation wiring hung in plain sight of the operator helps him to check switching orders visually.

KULMANN

NOMOGRAPHS

FOR

TRANSMISSION LINE CHARACTERISTICS

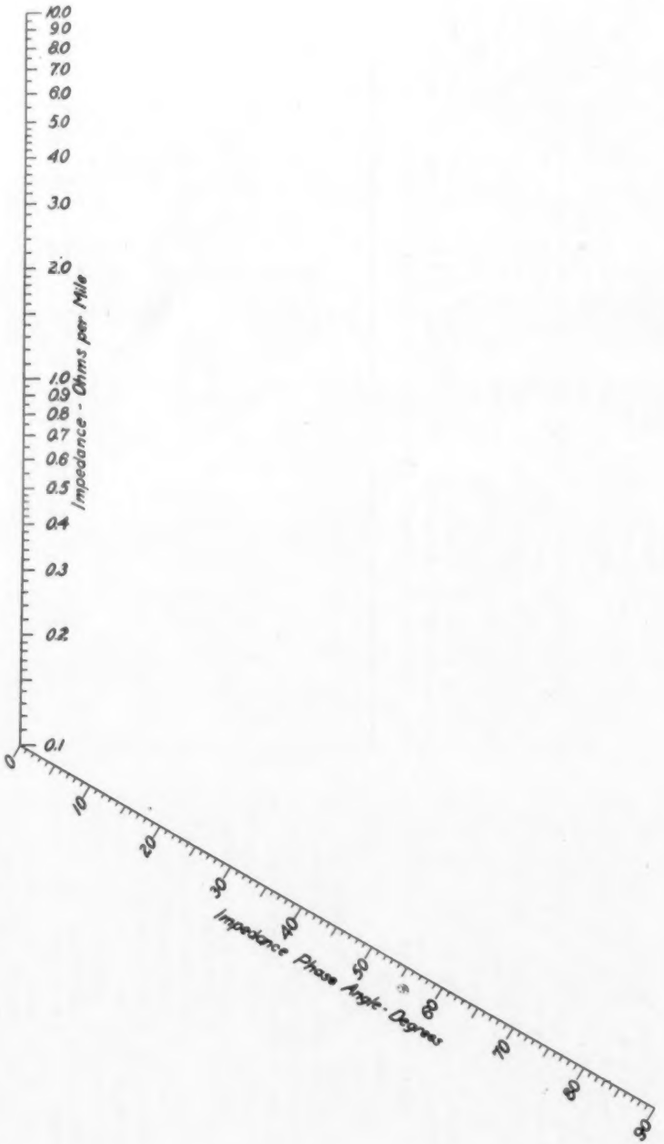
No. 6

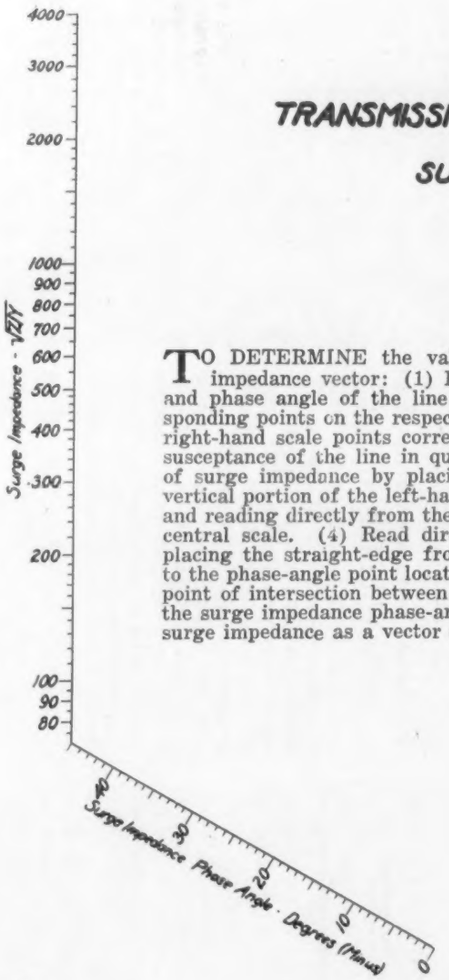
SURGE IMPEDANCE

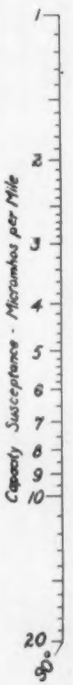
$\sqrt{Z/Y}$

C. Ulx Kulmann

4-17-25







Nomograph No. 6

TO DETERMINE the value or magnitude and phase angle of the surge impedance vector: (1) Determine from chart No. 4 the value or magnitude and phase angle of the line impedance as a vector quantity and locate corresponding points on the respective parts of the left-hand scale. (2) Locate on the right-hand scale points corresponding to the value and phase angle of capacity susceptance of the line in question. (3) Determine the desired numerical value of surge impedance by placing a straight-edge from the point located on the vertical portion of the left-hand scale to the point located on the right-hand scale and reading directly from the point of intersection between straight-edge and the central scale. (4) Read directly the desired surge impedance phase angle by placing the straight-edge from the point located on the left-hand sloping scale to the phase-angle point located at the foot of the right-hand scale and noting the point of intersection between straight-edge and central sloping scale. Note that the surge impedance phase-angle is a negative angle. These steps fully evaluate surge impedance as a vector quantity.

Transmission Line Nomographs—No. 6

Graphical Solution for Determination of Numerical Value of First Half of Second Term in Voltage Characteristic Equation

By C. ALBERT KULMANN*, Pelton Water Wheel Company, San Francisco.

CONTINUING with the graphical solution of transmission-line characteristics, chart No. 6 of the series dealing with that subject is presented on the facing page. With the aid of the charts already published and those yet to be published in this series, it is possible to determine accurately and quickly the characteristics of a transmission line, knowing the size and spacing of the conductors, the length of the line and the frequency at which it will operate.

In the simplified form of voltage characteristic equation,

$$E_1 = E_2 \cosh Vl + I_2 U \sinh Vl,$$

as derived in the article accompanying chart No. 4 (Electrical West, May 1, 1929, pp. 278-79), the first term has been evaluated by means of chart No. 5 (Electrical West, July 1, 1929, pp. 22-23). It is the second term of that simplified voltage equation that is to be considered in connection with and solved by means of the accompanying chart No. 6.

In this second term, I_2 represents the load current, a vector quantity of course. The second factor, U, represents the value of the surge impedance of the line, the square root of the quotient of the line impedance and admittance as symbolized by

$$\sqrt{\frac{Z}{Y}}$$

The third factor of this term will be determined and evaluated by chart No. 7 and its accompanying discussion which will appear in an early issue of Electrical West.

To evaluate surge impedance refer back to chart No. 4 wherein was presented a graph section by means of which the impedance as a vector quantity could be determined by direct reading when the resistance and reactance per mile of line are known. These values as determined on chart No. 4 are carried over to chart No. 6 and the corresponding points located on the left-hand scale, the magnitude on the vertical part of the scale and the angle on the sloping portion of the scale. Then using the same value of capacity susceptance as before, the point corresponding to its magnitude is located on the right-hand scale of chart 6 and its angle (assumed to be 90 deg.) of course will correspond to the point so marked at the lower end of the right-hand scale in chart 6. By placing a straight-edge on the chart in such a manner as to connect the two scale points just located corresponding to the value of impedance and the value of capacity susceptance, and noting the point of intersection between the straight-edge and the center sloping scale, the phase angle of the vector quantity "surge impedance" may be read directly. Thus the two direct scale readings fully evaluate the quantity in question.

Numerical Example

To cite a numerical example, assume the same values given in the article accompanying chart No. 4, 0.16 ohm per mile resistance, and 0.60 ohm per mile reactance, which gave the impedance factor a numerical value of 0.62 and a vector angle of 75 deg. The value of capacity susceptance was given as 6.0 micromhos per mile.

To apply these figures to chart 6, first lay a straight-edge from 0.62 on the impedance (left-hand vertical) scale to the point 6.0 on the capacity susceptance (right-hand) scale. Where the straight-edge intersects the central vertical scale a direct reading of the scale gives 322.0 as the value or magnitude of the surge impedance in question.

Next place the straight-edge from the 75-deg. point on the impedance phase angle (left-hand sloping) scale to the 90-deg. point on the right-hand scale. Reading directly from the point of intersection between the straight-edge and the central sloping scale the value 7.5 deg. is noted which is the desired surge impedance phase angle. Note that this angle is negative. These two readings fully determine and establish the surge impedance as a vector quantity.

EDITOR'S NOTE: This is the sixth of a series of useful nomographs dealing particularly with transmission line characteristics and prepared by the author from mathematical and experimental data. The seventh will evaluate the last term in the voltage equation and will appear in an early issue of ELECTRICAL WEST.

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NEW BOOKS for the Engineer

R.M.A. BETTER RADIO RECEPTION MANUAL. Paper bound; 20 pages; 6 x 9 in.; illustrated. Revised edition published April, 1929, by Radio Manufacturers Association, Inc., 32 Randolph St., Chicago; 11 West 42nd St., New York. Price 25 cents.—The subtitle of this pamphlet, "Home-Made Static and How to Avoid It," is literally descriptive of its contents. All of the common radio interference complaints are listed and specific information given as to ways and means of overcoming the trouble.

A SUMMARY OF ENGINEERING RESEARCH, edited by R. A. Seaton, secretary, The American Experiment Station Committee, Association of Land-Grant Colleges and Universities, and published (1929) by that organization. Paper bound; 6 x 9 in.; 98 pages. May be obtained from R. A. Seaton, Kansas State Agricultural College, Manhattan, Kan. Price $1.—This is a detailed listing of the activities and publications of the various institutions involved, as reported.

ELECTRICAL ENGINEERING PROBLEMS, PART II, A.C. CIRCUITS AND APPARATUS, by John G. Pertsch, Jr., late professor of electrical engineering, Cornell University. First edition; cloth bound; 6 x 9 in.; 105 pages; 48 illustrations; 432 problems. Published 1929 by McGraw-Hill Book Company, Inc., 370 Seventh Ave., New York. Price $1.40. For sale by Technical Book Shop, 883 Mission St., San Francisco.—This book is a companion volume to Part I dealing with d.c. circuits and apparatus. Both of these works were developed from problem sets used for a number of years for the junior students in electrical engineering at Cornell University. A classified series of concrete problems affords the student an opportunity to practice the applications of electrical engineering fundamentals. The problems have been designed to typify actual engineering practice wherever practicable.

UNIVERSITY OF WASHINGTON PUBLICATIONS. Publications recently released by the University of Washington, Seattle, include the following:

Bulletin No. 44, "The 500-Mile Transmission Line With Distributed Synchronous Condenser Capacity." 95 pages; price 90 cents.

Bulletin No. 46, "The Float-and-Sink Testing of Fine-Size Coal." 36 pages; price 35 cents.

Bulletin No. 47, "Strength Tests on Solid and Laminated Crossarms." 31 pages; price 30 cents.

Bulletin No. 48, "The Influence of Pipe Thickness on Re-entrant Intake Losses." 35 pages; price 35 cents.

Bulletin No. 49, "Radiography of Light Metal Alloys." 21 pages; price 25 cents.

RADIO TELEGRAPHY AND TELEPHONY, by Rudolph L. Duncan and Charles E. Drew, Radio Institute of America. First edition; cloth bound; 6 x 9 in.; 950 pages; 470 illustrations; numerous tabulations. Published 1929 by John Wiley & Sons, Inc., 440 Fourth Ave., New York. Price $7.50.—This book was written by two well-known teachers of radio subjects and is a product of the school division of the Radio Corporation of America. It accurately reflects up-to-date (1929) radio practice and is written in language that should make it of sure value to both novice and expert. Theory and practice are well combined throughout the text and mathematical treatments are limited to a minimum. The text is complete in itself, dealing with electrical characteristics and equipment, from fundamentals up, as they apply to radio communication.

THE HANDBOOK OF CORPORATE MANAGEMENT AND PROCEDURE, by Earl A. Saliers, Ph.D., formerly professor of accounting, Northwestern University. A Shaw Business Book. First edition; cloth bound; 6 x 8½ in.; 1,237 pages; illustrated with reproductions of 457 legal forms. Published 1929 by McGraw-Hill Book Company, Inc., 370 Seventh Ave., New York. Price $7.50. For sale by Technical Book Shop, 883 Mission St., San Francisco.—This volume presents data pertaining to corporate law, finance and management as these have been evolved to date. The modern corporation is of far-reaching importance and its activities and interests so manifold that constant effort is necessary to keep abreast of developments and interpretations. All of the information included in this text has been drawn from authoritative sources and references are given. Three parts constitute the book, Corporate Organization, Finance, and Management and Control.

PROTECTION AGAINST LIGHTNING, a Code prepared and published by the Bureau of Standards as Miscellaneous Publication No. 92. Paper bound; 5 x 7½ in.; 114 pages; illustrated. Published April, 1929. Price 25 cents. May be obtained from Superintendent of Documents, Government Printing Office, Washington, D. C.—The matter published in this booklet represents the results of several years' effort on the part of a sectional committee organized by the sponsoring organizations, the American Engineering Standards Committee, the American Institute of Electrical Engineers and the National Bureau of Standards. In its preparation the needs of both industry and the general public have been borne in mind. Three out of five parts of the ultimate contemplated Code are included in this booklet,—protection of persons, protection of buildings and miscellaneous property, and protection of structures containing inflammable liquids and gases. The other two parts, dealing with electrical apparatus and lines have been withheld for further consideration.

Ideas for the Contractor

Is *Consolidation* the Answer?

Can the Individualistic Contracting Game Find Anything to Help It in the Methods of Concentration Employed in Other Businesses?

CONTRACTING has resisted the inroads of consolidation and chain store organization longer than any other type of business. The reason for this is not far to seek. Basically contracting is a highly individualistic trade.

Manufacturing motors, for instance, is a process to which standardization can be applied easily. Machine methods make for economy. Greater production under one roof is logical. Hence most lines of manufacturing can be grouped, consolidated. The past few years have seen this possibility capitalized.

Central station operation is reasonably typical everywhere. Here again standardization is possible in a multitude of activities. Accounts must be uniform. Construction must follow definite standards. There are economies of finance and management in centralized control. Hence this branch of the industry has grouped and pyramided and expanded.

Jobbing is a matter of stockkeeping. As with banks, amassed stocks mean better service, more flexible control. It is only natural that the jobbing part of this industry should close up into consolidations.

Merchandising, too, fits into chain distribution. Buying economies, sales training en masse, co-ordinated selling plans and procedures, widespread advertising campaigns, have each made chain selling of even electrical merchandise practical and in some cases imperative. In some instances it was the dealer who built up the chain, such as in the washing machine set-up. In some cases the manufacturer established chains of outlets, as with refrigerators. In some cases the central station acted as the chain distributor, as with ranges.

It is only in electrical contracting today that the individual unit predominates. That electrical or for that matter any other type of building contracting has escaped chain organization is due less to a desire to escape than it is to the fact that contracting has offered poor ground for mass action. Several fundamental conditions prevail:

1. Practically every job is unique in itself. Standardization, therefore, except to a limited extent, is almost never possible.

2. Steady volume is very difficult to maintain. Many have tried to maintain it at the expense of margin with sad results.

3. Every job is under a different roof, almost. Only in the exceptional case of a string of houses to wire in a subdivision tract, each alike, can any semblance of mass production take place, and then only to a limited degree.

4. Labor-saving machinery can only be applied to certain operations, such as sawing and threading pipe.

5. The manual labor content of every operation is extremely high, and hence subject to all the hazards of poor workmanship, slow workmanship, poor planning and even sabotage.

6. The risks are great. Every job is subject to delays and risks due to causes entirely outside of the contractor's own control or jurisdiction.

From an operating standpoint, therefore, contracting is likely to remain individualistic. But from the business organization end of the game this is not true.

Every contracting establishment, in other words, has in its overhead or business organization a number of functions which are wastefully being duplicated in every shop in town. Each contractor now must:

1. Estimate each job. This means that every shop in town is paying the cost, in many cases, of making a separate estimate on the same job, where one or two would do.

2. Keep books. Each shop carries the burden of a separate bookkeeping and accounting staff, where one bookkeeping machine could handle the accounts of all in town at a definite saving.

3. Buy materials. One purchasing agent could handle better the buying and dispatching of materials for all the jobs in town, than a dozen proprietors, rushed and trying to care for all details of a business, and at less expense to all branches of the industry.

4. Stock materials. One warehouse for surplus stock left from a job or awaiting delivery to a job could do the work for a number of contractors each carrying shop rent now. The jobber, too, could better serve his function as a supply source.

5. Investigate risks. A central credit bureau can relieve the contractor of serious responsibility.

6. Assume full fixed cost on any labor-saving machinery, even though using it only occasionally.

7. Finance his work entirely himself, without benefit of the pooled financial strength and credit standing of a large organization.

8. Maintain his own legal counsel, pay for insurance on an individual basis, and any number of other business functions.

The question facing the contractor thus becomes simplified to the following: "Granting that there are opportunities for real financial gains in group handling of a number of the business or overhead phases of my business, what form of organization is best suited to perform these functions for me,—the association, or a consolidated group of contracting firms, say under a sort of holding company form, with a central management organization to handle all or most of these items?"

The answer to that question depends on the contractor's own local competitors. The association can and often does perform these business functions for its members. The central estimating or quantity survey bureau is a fact in many cities. Central bookkeeping is handled commercially by firms of accountants for other lines. Central buying and warehousing has never been tried. Joint ownership of labor-saving machinery is rare. Central credit investigating bureaus are often run by associations. Likewise other functions are often handled by an association. In many respects it is better that the association perform these functions.

The one vulnerable point in the association is that its activities depend almost entirely upon the voluntary action of its members. As long as all members agree and live up to voluntary

agreements the plan functions. Let one member disagree or become dissatisfied or impatient and the organization is threatened with collapse.

For that reason the commercial organization, legally and soundly organized, is better able to carry through its determined policies. The individual relinquishes individual privileges for the advancement of the whole organization.

There are other factors in the commercial organization which offer possibilities. Rather than competition for all work the individual members become specialists in one type of construction, such as residential, apartment house, commercial building, industrial and motor, and so on. Each member becomes in effect either a specialized officer, such as manager, treasurer, secretary, chief engineer, etc., or he becomes a sales specialist or work supervisor specialist. If he remains in the field he sells, plans, runs work under his classification, giving it more personal attention, makes ordinary collections, hires and fires his own staff and generally runs his department.

There are possibilities of a general sales staff, of an advertising and promotional department, something unknown in most contracting establishments; even the merchandising angles of the business fall into natural business channels under such a regime.

Perhaps the greatest and most deep rooted change possible from such an organization, however, is that of viewpoint. Such an organization form completely reverses the attitude of its members or it cannot exist. The relic of long discarded economic ideas is replaced with a viewpoint in accord with present-day business practice and theory.

It is plain to see that a right-about-face is the first essential. Bidding for work is begging for work, and begging as an institution is outlawed in America. It belongs to an older civilization and a different one. Modern business recognizes that it has something to sell, well worth what it asks for it, and requiring no apologies. To buy the privilege of doing work at a loss by cutting price is out of line with the new and sound economic principle that only the transaction in which all receive full value for their pains is acceptable.

Where Electrical Equipment Is a Show Feature

SELDOM is the electrical equipment of an office building so designed and laid out as to be a show feature of the institution. In the Roosevelt Building, Seventh and Flower Sts., Los Angeles, a large medical and dental office building, the opposite is true. Here the electrical equipment is made a feature of the building.

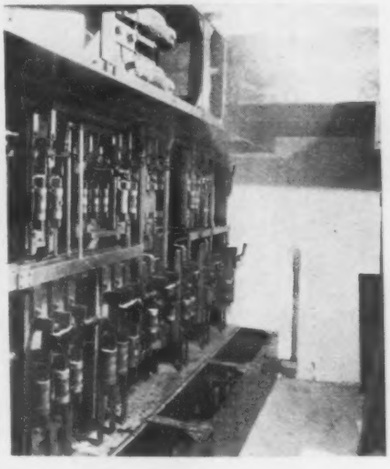
The building was designed by Curlett & Bellman, architects, and the electrical work was done by the Newbery Electric Corporation, of Los Angeles.

The elevator penthouse is the largest of any in Los Angeles. Long rows of elevator equipment are so arranged as to make an excellent display. It is well lighted, and the equipment is always kept in first-class, ship-shape condition.

The elevator cages themselves are lighted in a unique way by means of cove lights instead of the usual semi-indirect bowl.

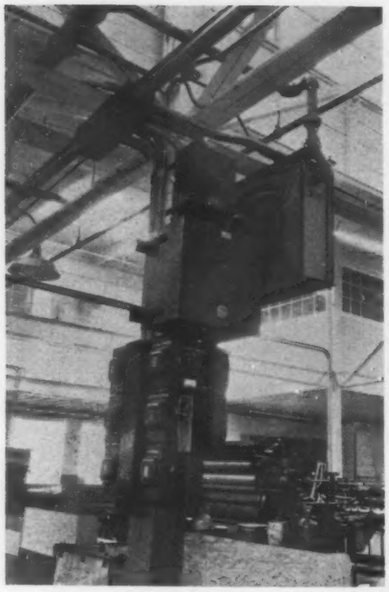
The main switchboard room likewise is a show place of the building. The room has a long glass door through which the white marble board with its oxidized metal switch handles makes an excellent appearance.

Some of the special wiring features



of the building are to be found in the manner in which the switchboard is arranged. The main feeders from the transformer vault come into a large can at the top of the board through a 4-in. conduit. The back of the board is completely bused with bare copper buses sweated and riveted together, polished and lacquered for finish. No rubber covering or cambric is used. Likewise at the bottom of the board a long and large gutter is provided for the termination of the conduits which feed to various parts of the building.

The main transformer vault is supplied by two services from the Los Angeles Gas and Electric Corporation's lines. An automatic bypass switch provides immediate throw-over in case of failure of the particular service in use. In the vault are three 150-kva. transformers to supply the building lighting. Three 100-kva. transformers supply the power for the building and a separate 75-kva. transformer is used to supply energy for the dental and X-Ray apparatus in the doctors' offices.



Small panels and preset remote control cabinets were mounted on the pillars. Note mounting of fan for heating or cooling.

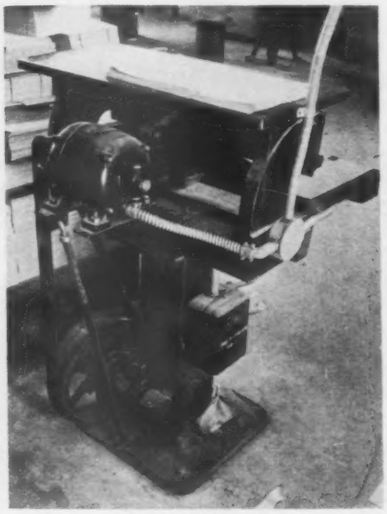
Changing a Printing Plant

Contractor Takes Full Responsibility and

PRICE means nothing if satisfaction must be sacrificed. To many firms complete relief from all responsibility or worry is worth more than what might be saved on a lower bid. Where the electrical contractor is willing to assume without a single qualification the full responsibility for the job's giving complete satisfaction he is able often to get it at his own price.

Such was the experience of the Pacific Electric Motor Company of Oakland with the Sunset-McKee Sales Book Company. The problem was a perplexing one. Few contractors would have assumed complete responsibility for the results. When this industrial electrical contractor guaranteed to accomplish a change-over without interruption and with satisfaction in all respects, cost of the installation was a secondary consideration.

This was the problem, therefore. The Sunset Company, of San Francisco, had two plants, both operated with direct current. One of these was the Hall-White Company in Oakland, with which the Sunset was associated. Some months ago these two firms were merged with the McKee Sales Book Company of Oakland, which was operated with alternating current, 220-volt, three-phase, 60-cycle. It was decided to bring these plants under one roof. Accordingly an additional building was erected next to the McKee plant in Oakland which would double the capacity of that plant.



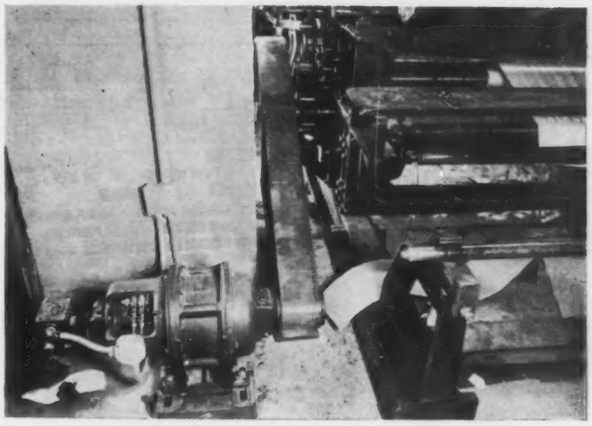
The question as to how to handle the electrical load arose immediately. Would the new plant be operated half by a.c. and the other half d.c., served by a motor-generator set? It was here that the contractor's advice and willingness to assume responsibility for results came in. Although costs apparently favored d.c. it was decided that a.c. more nearly fitted in to present-day practice, that it simplified power distribution problems, and that it was the logical successor to older d.c. methods. One bank of transformers could be made to serve the entire plant for both power and light. As long as a.c. eventually would be used it was better to make the change now during the moving and merging of the plants than to risk future interruptions and distribution difficulties.

To guarantee to perform with a.c. equipment all the variable and flexible requirements formerly handled with direct current required a thorough study of each machine to be changed over. Every piece of equipment was listed as to name, type of load, starting, stopping and running characteristics,

Above: A spring mounting for the motor which drives a multiple punch keeps the belt taut. *Below*: Transformer vault and switchboard. Service enters oil switch through underground. Feeders from transformers run through the overhead conduit to the board on the other side of the wall.

from D. C. to A. C.

Makes Good on Difficult Engineering Job



Large fanfold press driven by 7½-hp. motor is equipped with torque switch stop relay mounted on end of shaft, which is the equivalent of dynamic braking on a d.c. motor.

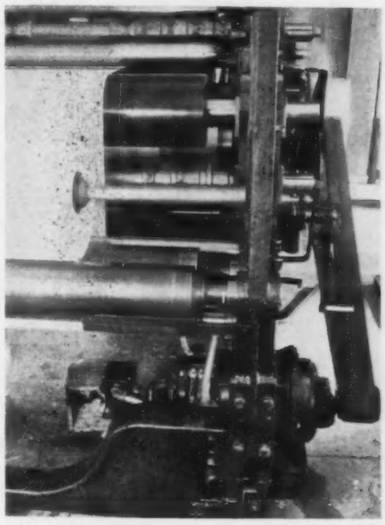
speed, and type of control necessary. Tests of load and speed and torque were made. From this information the particular type of a.c. equipment which would duplicate these conditions had to be plotted. This involved every type of a.c. control, including brush shifting, single-phase motors up to 1 hp., slip ring type motors with preset magnetic control, and accessories of all sorts.

When this had been plotted, the work was so laid out that the new mountings for the motors were fashioned and the apparatus ready to assemble when the printing equipment was being moved from the old to the new plant. Thus the new equipment was installed and no time was lost in the operation of the machinery, except the actual moving time. There was not time for testing equipment to see whether it would work. It had to be right and had to work. That was the guarantee.

In this connection it required careful judgment as to sizes of motor equipment. In applying the a.c. slip ring motors it was important not to get them too large, which would sacrifice speed regulation, or too small, at the expense of torque to start under load.

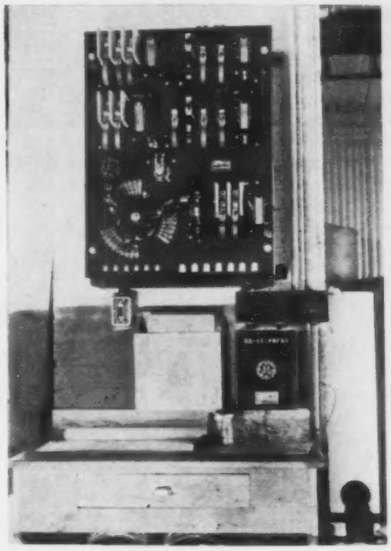
Some of the particular applications are worthy of special description.

The original electrical layout was made along the lines of least resistance, which would have been to run a large service pipe outside to accommodate the heavy service on 220 volts. It was out of the question to change to 440 volts since much of the plant was motorized with 220-volt equipment. This layout, too, would have presented distribution problems of importance.



The smaller size of the a.c. motor permits mounting on the frame of the 22-in. fanfold press.

The contractor was able to show the owner the advantages which would accrue from the installation of a transformer vault and the building plans were changed accordingly. This enabled



Special G.E. preset printing press control panel, cover removed. Provides forward, reverse, jog, stop, and slow and fast speeds by definitely pre-determined steps.

the Pacific Electric Motor Company to bring service at 4,000 volts in underground, down a pole, under the sidewalk and into the vault at the front of the building to a main oil circuit breaker. This breaker was placed in the end of the vault in such a way as to make the control handle, on the other side of the partition, readily accessible and capable of serving as main switch.

All joints of the lead cable in the vault were wiped in neatly by the Pacific Gas and Electric Company construction crews. All lead sheathes, transformer and breaker cases are bonded to a common ground. Three transformers were installed, two 25-kva. and the center one 50-kva., to take care of the additional single-phase lighting load. They are Y connected on the primary side.

Eliminating a second switch the transformer leads go directly to the current transformers for metering through a 4½-in. conduit. From there they go into a raceway to the individual motor circuit or feeder switches serving centers of distribution. The power company meters the current on the secondary side and has equipped its meter with a test block.

The feeders from the main panel serve distribution boards at various parts of the plant, the smaller of which and the most interesting being those mounted on columns supporting the roof trusses, as illustrated here. Thus mounted they occupy no floor space, cut off no light, and are near the machines and in plain sight and so eliminate the need for further disconnecting switches.

Also mounted on the pillars are the present controllers for the 3-hp. offset presses. Another feature is the mounting of the fan, used in connection with a steam radiator for heating or cooling the plant. This is an important item in a printing plant for the condition of the air has much to do with the handling of paper.

Most interesting is the application of a.c. motors to the press equipment. One particular little problem is worth noting. Multiple punches operate at slow speeds. In changing over the drive on one of these punches a ½-hp., three-phase, 1,200-r.p.m. motor was desired because of its size and the possibility of mounting it on the frame of the punch, so as to make a unit of the machine. This necessitated an extreme belt ratio of from 1½-in. pulley at the motor to a 16-in. pulley on the shaft. As long a belt as possible was desirable so the motor was mounted on a hinged bracket just behind the table of the punch. A rod within a pipe, pushed up by a strong spring, was devised to keep the motor at constant tension against the belt.

All motors, though only ¼- or ½-hp., were equipped with push button control with overload and undervoltage protection.

The large fanfold presses, which print complicated multiple-fold invoice and billing forms from rolls of paper, require special consideration in chang-

ing over from d.c. to a.c. After the motor size had been determined control equipment to duplicate the direct current flexibility had to be obtained. For a standard press simpler equipment would have availed. Yet with standard equipment the requirements were met.

To set in motion such heavy presses particularly high torque was needed at the start and wide speed range after starting. A standard 7½-hp. slip ring motor was selected to run the 33-in. press and a 5-hp. motor of the same type to run the 22-in. press. To provide control which would give, by means of push buttons, forward, reverse, jog, stop, slow speed and pre-determined fast speeds the G.E. preset printing press control panel, C.R. 6133 B5, was selected, to which was added a box thermal overload relay. This panel provides, by means of a pendulum and escapement relay, a definite time delay which allows maximum torque on the motor at starting. Nippled to the bottom of the controller box was placed a push button to provide "safe run" in case of work on the machine. This button cuts off all current until released in cases where men get into the press to make repairs.

To take the place of dynamic braking of the motors, provided by d.c. operation, and yet eliminate the need for a large solenoid brake, an ingenious torque switch relay (C.R. 2960 S.Y. 72 F.) was mounted on these motors. To stop the motor the reversing switch is actuated. This tends to brake the motor and bring it to a standstill. Then at the moment when it would start to reverse the torque relay on the motor shaft opens the circuit and shuts off the current.

All assumptions and recommendations made by the contractors worked out satisfactorily with the single exception of the two 3-hp. offset presses, which appeared to have been undermotored. After analysis it was found that the running load was well within the rating of the motor and the size gave good speed regulation. The only difficulty was in the starting. The control was rearranged to give high torque on starting and no further trouble was experienced.

No Royal Road to Industrial Illumination

Study of Requirements and Planning to Meet Them From Data of Manufacturers Is Only Sure Method of Achieving Full Satisfaction

By J. R. WILSON, Quality Electric Works, Los Angeles.

BLAME for the many hit-or-miss illuminating installations still doing duty in the older types of industrial plants can be laid to a lack of adequate scientific lighting data available at the time these installations were made. Installations are no longer made on that basis, because it is now realized that "there is no simple formula by which a satisfactory lighting system can be worked out for every industrial plant."*

Conditions vary in each type of industrial plant as well as in plants making the same product. Each department of the same plant may require a different type of lighting equipment and a different degree of illuminating intensity. It is necessary to study each department of a plant on a basis of the kind of work being done and to provide the kind and amount of lighting required to perform each operation. In each case the objective desired is maximum production consistent with minimum spoilage and minimum cost of current for such lighting.

To attain this objective there are four general rules which apply to all types of lighting installations, whether for industrial lighting or other purposes. These rules are:

1. To provide enough light.
2. To distribute this light effectively.
3. To reduce glare to a minimum.
4. To secure light of the best color for the work to be done.

Strict adherence to these rules means that, for factory lighting at least, lighting equipment having the following characteristics must be selected:

1. A specific light distribution adapted to each application.
2. The greatest possible utilization in efficiency. (The light is directed, without waste, to useful points.)
3. No permanent depreciation of the reflecting surface.
4. Low temporary depreciation (due to dust and dirt.)

Each type of manufacture requires a different degree of illumination, and many engineers have formulated rules for the application of light to industry. In addition, many states have set up rules requiring specific amounts of light for performing industrial operations. Where these state rules are in force the contractor must of necessity be guided thereby, although these rules are usually defined as "minimum requirements," and do not prohibit the use of higher intensities, provided dangerous "glare" is eliminated.

For purposes of the study of the variation of illumination requirements, there is presented herewith one of the best of these tables. This table was prepared by the engineers of one of the large manufacturers of lighting equipment, the Benjamin Electric Manufacturing Company, and therefore can be used with the assurance that satisfactory illumination will result.

* Holophane Company, Inc.

Recommended Foot-Candle Intensities for Industrial Interiors

THE following recommended foot-candles for industries and operations in industry comply fully with all state codes and in general are higher. State codes are based on the minimum degree of illumination necessary for the preservation of vision and avoidance of accidents, whereas these recommendations are based upon these considerations plus the advantages of less costly production, decreased spoilage and increased production.

The values given are for good productive lighting. Almost without exception where higher intensities are used, increased production and reduced spoilage will result.

(For manufacturing processes marked with an arterisk (*) other factors, such as direction of light, etc., are of unusual importance.)

	Minimum	Good Practice
Aisles, Stairways, Passageways	2 to	3
Assembling		
Rough	5 to	8
Medium	8 to	12
Fine	12 to	20
Extra fine	25 to	100
Automobile Manufacturing		
Automatic screw machines	10 to	15
Assembly line	10 to	15
Frame assembly	8 to	12
Tool making	12 to	20
Body manufacturing		
Assembly	10 to	15
*Finishing and inspecting	25 to	100
Bakeries	8 to	12
Book Binding		
Folding, assembling, pasting	5 to	8
Cutting, punching, stitching	8 to	12
Embossing	10 to	15
Candy Making	8 to	12
Canning and Preserving	8 to	12
Chemical Works		
Hand furnaces, boiling tanks, stationary driers, stationary or gravity crystallizing	3 to	5
Mechanical furnaces, generators and stills, mechanical driers, evaporators, filtration, mechanical crystallizing, bleaching	4 to	6
Tanks for cooking, extractors, percolators, nitrators, electrolytic cells	6 to	10

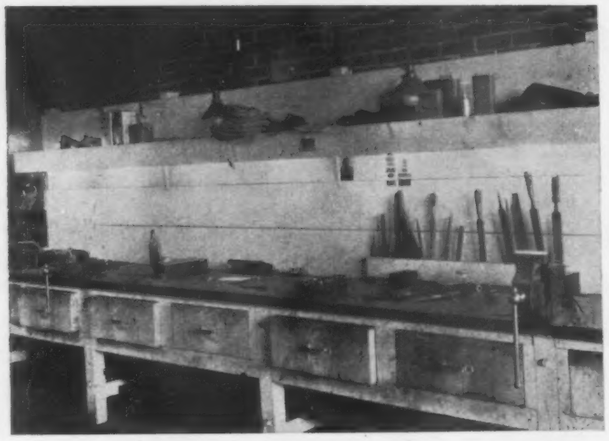
	Minimum	Good Practice
Clay Products and Cements		
Grinding, filter presses, kiln rooms	3 to	5
Molding, pressing, cleaning and trimming	5 to	8
Enameling	6 to	10
*Coloring and glazing	10 to	15
Cloth Products		
Cutting, inspecting, sewing		
Light goods	10 to	15
Dark goods	25 to	100
Pressing, cloth treating		
Light goods	8to	12
Dark goods	12 to	20
Coal breaking and washing, screening	3 to	5
Construction—Indoor general	3 to	5
Dairy Products		
Separators, butter and cheese working	8 to	12
Electric Manufacturing		
*Storage battery, molding of grids, charging room	6 to	10
Coil and armature winding, mica working, insulating processes	12 to	20
Elevator—freight and passenger	5 to	8
Engraving	25 to	100
Forge shops and welding	6 to	10
Foundries		
Charging floor, tumbling, cleaning, pouring and shaking out	5 to	8
Rough molding and core making	6 to	10
Fine molding and core making	10 to	15
Garage—Automobiles		
Storage—dead	2 to	8
live	5 to	8
Repair department, washing	10 to	15
Glass works		
Mix and furnace rooms, pressing and lehr glass blowing machines	6 to	10
Grinding, cutting glass to size, silvering	8 to	12
Fine grinding, etching and decorating	10 to	15
Glass cutting (cut glass)	15 to	50
*Fine polishing and inspecting	15 to	50
Glove Manufacturing		
Light goods		
Cutting, pressing, knitting	8 to	12
Sorting, stitching, trimming and inspecting	10 to	15
Dark goods		
Cutting, pressing, knitting	10 to	15
Sorting, stitching, trimming and inspecting	25 to	100
Hat Manufacturing		
*Dyeing, stiffening, braiding, cleaning and refining		
Light	6 to	10
Dark	10 to	15
Forming, sizing, pouncing, flanging, finishing, ironing		
Light	8 to	12
Dark	10 to	15
Sewing		
Light	10 to	15
Dark	25 to	100
Ice Making		
Engine and compressor room	6 to	10
Inspecting		
Rough	6 to	10
Medium	10 to	15
Fine	15 to	25
Extra fine	25 to	100
*Glossy or polished surfaces	Glint lighting	
Jewelry and watch making	25 to	100
Laundries and dry cleaning	8 to	12
Leather Manufacturing		
Vats	3 to	5
Cleaning, tanning, stretching	4 to	6
Cutting, fleshing and stuffing	6 to	10
Finishing and scarfing	10 to	15
Leather Working		
Pressing, winding and glazing		
Light	8 to	12
Dark	10 to	15
Grading, matching, cutting, scarfing, sewing		
Light	10 to	15
Dark	25 to	100
Locker rooms	4 to	6
Machine Shops		
Rough bench and machine work	6 to	10
Medium bench and machine work, ordinary automatic machines, rough grinding, medium buffing, polishing	10 to	15
Fine bench and machine work, fine automatic machines, medium grinding, fine buffing and polishing	12 to	20
Extra fine bench and machine work, grinding (fine work)	25 to	100
Meat Packing		
Slaughtering	5 to	8
Cleaning, cutting, cooking, grinding, canning, packing	8 to	12
Milling—Grain Foods		
Cleaning, grinding and rolling	5 to	8
Baking or roasting	8 to	12
Flour grading	15 to	25
Offices		
Private and General		
Close work	10 to	15
No close work	8 to	10
Drafting room	15 to	25
Packing		
Crating	4 to	6
Boxing	6 to	10
Paint manufacturing	6 to	10
Paint Shops		
Dipping, spraying, firing	5 to	8
Rubbing, ordinary hand painting and finishing	8 to	12
Fine hand painting and finishing	10 to	15
*Extra fine hand painting and finishing (automobile bodies, piano cases, etc.)	25 to	100

	Minimum	Good Practice
Paper Box Manufacturing		
Light	6 to	10
Dark	8 to	12
Storage of stock	3 to	5
Paper Manufacturing		
Beaters, machine, grinding	4 to	6
Calendering	6 to	10
Finishing, cutting, trimming	8 to	12
Plating	5 to	8
Polishing and burnishing	8 to	12
Power Plants		
*Engine rooms, boilers, coal and ash handling, storage battery rooms	3 to	5
Auxiliary equipment, oil switches and transformers	5 to	8
Switchboard, engines, generators, blowers, *compressors	6 to	10
Printing Industries		
Matrixing and casting, miscellaneous machines, presses	8 to	12
Proof reading, lithographing, electrotyping	10 to	15
Linotype, monotype, typesetting, imposing stone, engraving	25 to	100
Receiving and shipping	4 to	6
Rubber Manufacturing and Products		
Calenders, compounding mills, fabric preparation, stock cutting, tubing machines, solid tire operations, mechanical goods building, vulcanizing	8 to	12
Bead building, pneumatic tire building and finishing, inner tube operation, mechanical trimming, treading	10 to	15
Sheet Metal Works		
Miscellaneous machines, ordinary bench work	8 to	12
Punches, presses, shears, stamps, welders, spinning, fine bench work	10 to	15
*Tin plate inspection	15 to	25
Shoe Manufacturing		
Hand turning, miscellaneous bench and machine work	8 to	12
Inspecting and sorting raw material, cutting, lasting and welding (light)	10 to	15
Inspecting and sorting raw material, cutting, stitching (dark)	25 to	100
Soap Manufacturing		
Kettle houses, cutting soap chip and powder	5 to	8
Stamping, wrapping and packing, filling and packing soap powder	6 to	10
Steel and Iron Mills		
Bar, sheet and wire products, soaking pits and reheating furnaces	2 to	3
Charging and casting floors	4 to	6
Muck and heavy rolling, shearing, rough by gauge, pickling and cleaning	5 to	8
Plate inspection, chipping	15 to	25
Automatic machines, rod, light and cold rolling, wire drawing, shearing, fine by line	8 to	12
Steel fabrication—girder and truss assembly	6 to	10
Stone, Crushing and Screening		
Belt conveyor tubes, main line shafting, spaces, chute rooms, inside of bins	2 to	3
Primary breaker room, auxiliary breakers under bins	3 to	5
Screen rooms	5 to	8
Store and Stock Rooms		
Rough bulky material	2 to	3
Medium or fine material requiring care	5 to	8
Sugar grinding	15 to	25
Testing		
Rough	5 to	8
Fine	10 to	15
Extra fine instruments, scales	25 to	100
Textile Mills		
(Cotton)		
Operating and lapping, carding, drawing-frame, roving, dyeing	5 to	8
Spooling, spinning, drawing-in, warping, weaving, quilting, inspecting, knitting, slashing (over beam end)	8 to	12
(Silk)		
Winding, throwing, dyeing	8 to	12
Quilling, warping, weaving and finishing	8 to	12
Light goods	10 to	15
Dark goods	15 to	20
(Woolen)		
Carding, picking, washing and combing	4 to	6
Twisting and dyeing	6 to	10
Drawing in, warping		
Light goods	6 to	10
Dark goods	10 to	15
Weaving		
Light goods	8 to	12
Dark goods	12 to	20
Knitting machines	10 to	15
Tobacco Products		
Drying, stripping, general	2 to	3
Grading and sorting	15 to	25
Toilets and washrooms	4 to	6
Upholstering		
Automobile, coach and furniture	10 to	15
Warehouse	2 to	3
Woodworking		
Rough sawing and bench work	5 to	8
Sizing, planing, rough sanding, medium machine and bench work, gluing, veneering, cooperage	8 to	12
Fine bench and machine working, fine sanding and finish	10 to	15

MOTOR

A Department for and by Motor Specialists

Work Bench Lighted From Simple Cove



A WELL-DESIGNED work bench for the motor shop saves workmen's time and promotes efficiency. This has been the experience of Backstrand Brothers, Riverside, Calif., since erecting the work bench shown in the accompanying illustration.

The method of lighting the bench is ingenious in that a cove is run along the back wall above the bench. In this the lamps are housed. No direct light can reach the workmen's eyes. The trough in which the lamps are placed acts as the diffusing and reflecting medium which throws an even spread of light on the top of the bench. Pull chains are provided for ease in turning on the individual lights as wanted.

An advantage in handling the lighting thus is that no fixtures are dangling from the ceiling to interfere with overhead space. General lighting is provided for the entire shop from RLM reflectors at the ceiling, but where more light is needed on the bench this method provides it without obstructing head space.

Useful and Ornamental Too

DESIGNED particularly for the handling of motors, a new truck of the California Electric Works, San Diego, Calif., is also one of the company's best advertisements. Painted in brilliant colors, equipped with a sunlight sign on the front of the cab carrying the names of manufacturers of various equipment handled by the firm, it is a moving billboard of the company's motor services.

From a practical standpoint it has a collapsible crane which can be mounted at will. It is capable of handling motors up to 125 hp. very easily. The crane boom is made of pieces of pipe strapped to the floor. The boom action is regulated by a block and tackle. On the end of the boom a chain block is used to raise and lower motors from the end of the truck.

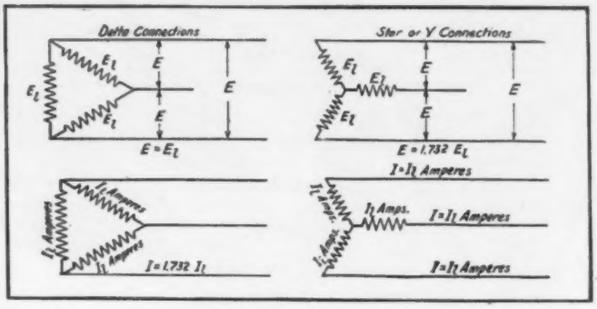
EFFECT OF CHANGES OF

THE starting torque of an induction motor will vary as the square of the voltage applied to the primary; hence, the primary voltage required to produce a given starting torque can be determined by the formula:

$$V^1 = V\sqrt{\frac{T_1}{T}}$$

where:

V^1 = Required voltage.
T_1 = Required torque.
V = Full rated voltage.
T = Starting torque at full voltage.



Example

A squirrel cage induction motor is required to start with full load torque only, and the starting torque at full voltage is 2.5 times full load torque, therefore the starting voltage should be:

$$V = V\sqrt{\frac{1}{2.5}} = .63 \text{ volts,}$$

or starting voltage should be 63 per cent of full voltage.

In squirrel cage induction motors the starting current depends upon the starting voltage applied, and is independent of the torque required to start the load. However, the current falls almost immediately to the value corresponding to the required torque. It then gradually decreases until the motor reaches full speed. It follows then, that the starting voltage should not be greatly in excess of that required for the torque.

In the case of wound rotor induction motors (when started by means of resistance inserted in the secondary circuit) acceleration to full load speed with full load torque usually can be attained with current very little above that of full load current.

Variations in voltage or frequency not exceeding 10 per cent are generally permissible with any type of induction motor. However, such variations are always accompanied by changes from normal performance, with either the voltage or the frequency differing from normal. It is interesting to note the degree of these changes, as given below:

Character of Change	Power Factor	Torque	Slip	Efficiency
Voltage higher..	Decreased	Increased	Decreased	Decreased
Voltage lower....	Increased	Decreased	Increased	Increased
Freq. higher.....	Increased	Decreased	Unchanged	Increased
Freq. lower.....	Decreased	Increased	Unchanged	Decreased

In no case should the voltage and frequency be varied simultaneously in opposite directions, that is, one increased

VOLTAGE AND FREQUENCY

and the other decreased. If it be necessary to operate an induction motor on other than standard frequency, better performance will be attained if the voltage is changed in proportion to the square root of the frequency. For example: Take a 220-volt, 60-cycle motor to be operated on 50-cycle current. It will have very nearly its normal operating performance if the voltage is decreased to:

$$220 \times \sqrt{\frac{50}{60}} = 200$$

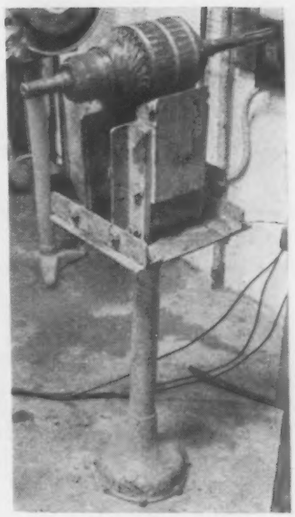
Three-phase circuits may be connected in delta (Δ) or in star (Y), as shown in the diagram. With three transformers connected in delta, the voltage across each transformer is the same as the line voltage, ($E_1 = E$). The current in each line wire is the instantaneous sum of the currents through two transformers ($I = 1.7321_1$). If three transformers are connected in star, $E = 1.732E_1$ and $I = I_1$.

The accompanying table gives full load currents of many of the different types of electric motors.

The author is indebted to the Westinghouse Electric & Manufacturing Company and the General Electric Company for use of much of the data contained herein.

(To be continued.)

Puts "Growler" Where It Belongs



MOST shops repairing motors have some form of "growler" for the locating of shorts and open circuits in armature coils of motors. The particular feature of that used by the California Electric Works, San Diego, is the fact that it was made in its own shop and out of automobile parts. A Ford differential housing was used for the base. This makes a neat pedestal for the "growler." It also makes it accessible on all sides for the testing of armatures for loose bars, cross connections, open circuits or shorts. This particular "growler" is used to test rotors of motors of 100 hp. or under, either a.c. or d.c.

FULL-LOAD CURRENTS OF MOTORS

The following data are approximate full-load currents for motors of various types, frequencies and speeds. They have been compiled from average values for representative motors of their respective classes. Variations of 10 per cent above or below the values given may be expected.

AMPERES—FULL-LOAD CURRENT

H.P. OF MOTOR	Direct-current Motors			Alternating-current Motors																					
				Single-phase Motors		Squirrel-cage Induction Motors										Slip-ring Induction Motors									
						Two-phase					Three-phase					Two-phase					Three-phase				
	115-volt	230-volt	550-volt	110-volt	220-volt	110-volt	220-volt	440-volt	550-volt	2200-volt	110-volt	220-volt	440-volt	550-volt	2200-volt	110-volt	220-volt	440-volt	550-volt	2200-volt	110-volt	220-volt	440-volt	450-volt	2200-volt
¼	....	....	....	7.6	3.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
½	4.5	2.3	....	8.0	4.0	4.1	2.1	1.0	0.9	....	4.8	2.4	1.2	1.0	....	....	....	....	....	....	....	....	....	....	....
¾	6.5	3.3	1.4	9.6	4.8	4.8	2.4	1.2	1.0	....	5.6	2.8	1.4	1.1	....	6.2	3.1	1.6	1.3	....	7.2	3.6	1.8	1.5	....
1	8.4	4.2	1.7	11.0	5.5	5.6	2.8	1.4	1.1	....	6.4	3.2	1.6	1.3	....	6.7	3.4	1.7	1.4	....	7.8	3.9	2.0	1.6	....
1½	12.5	6.3	2.6	15.0	7.5	7.8	3.9	2.0	1.7	....	9.0	4.5	2.3	1.9	....	11.7	5.9	3.0	2.3	....	13.6	6.8	3.4	2.7	....
2	16.1	8.3	3.4	20.0	10.0	9.7	4.9	2.4	2.0	....	11.2	5.6	2.8	2.3	....	12.5	6.3	3.1	2.5	....	14.4	7.2	3.6	2.9	....
3	23	12.3	5.0	27.8	13.9	....	7.8	3.9	3.1	....	....	9	4.5	3.6	....	....	8.7	4.3	3.5	....	....	10	5.0	4.0	....
5	40	19.8	8.2	46.6	23.3	....	13	6.5	5.2	....	....	15	7.5	6.0	....	....	13.0	6.5	5.2	....	....	15	7.5	6.0	....
7½	58	28.6	12	67.6	33.8	....	19	9.5	7.6	....	....	22	11.0	8.8	....	....	20.0	10.0	7.6	....	....	23	11.5	8.8	....
10	75	38	16	86.0	43.0	....	24	11.3	9.4	....	....	27	13.5	10.8	....	....	24.3	12.1	10.0	....	....	28	14.0	11.2	....
15	112	56	23	....	....	....	33	16.5	13.2	....	....	38	19.0	15.2	....	....	39	19.5	15.6	....	....	45	22.5	18.0	....
20	149	74	31	....	....	....	45	22.5	18.2	5.0	....	52	26.0	21.0	5.7	....	49	24.7	19.8	....	....	57	28.5	22.8	....
25	185	92	38	....	....	....	56	27.7	22.2	6.4	....	64	32.0	25.6	7.4	....	60	30.0	24.0	6.4	....	69	34.5	27.6	7.4
30	220	110	45	....	....	....	67	33.5	27.0	7.4	....	77	38.5	31	8.5	....	72	36.0	28.8	7.8	....	83	41.5	33.2	9
40	294	146	61	....	....	....	88	44	35.5	9.5	....	101	50.5	41	11.0	....	93	46.5	37.3	9.5	....	107	53.5	43	11
50	364	180	75	....	....	....	109	54	43.5	12.1	....	125	62.5	50	14.0	....	113	57	45	12.1	....	131	65.5	52	14
60	436	215	90	....	....	....	129	65	52	13.5	....	149	74.5	60	15.5	....	135	68	54	14.0	....	156	78.0	62	16
75	540	268	111	....	....	....	156	78	62.5	16.7	....	180	90	72	19.2	....	164	82	65	17.3	....	189	94.5	75	20
100	....	357	146	....	....	....	213	107	87	21.7	....	246	123	100	25	....	214	108	87	21.7	....	247	124	100	25
125	....	440	184	....	....	....	270	134	109	27.0	....	310	155	124	31	....	267	134	108	27	....	308	154	123	31
150	....	....	220	....	....	....	....	156	125	31.2	....	....	180	144	36	....	315	158	127	32	....	364	182	146	37
175	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
200	....	....	....	....	....	....	....	217	173	43.3	....	....	250	200	50	....	430	216	173	44	....	498	249	200	51
225	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
250	....	....	....	....	....	....	....	265	213	54.0	....	....	305	245	62	....	535	268	214	55	....	616	308	246	63
275	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
300	....	....	....	....	....	....	....	320	255	63.2	....	....	368	295	73	....	654	325	260	65	....	750	375	300	75
350	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
400	....	....	....	....	....	....	....	440	355	88.5	....	....	508	410	102	....	....	430	343	85	....	....	495	396	98
450	....	....	....	....	....	....	....	520	416	95.2	....	....	600	480	110	....	....	502	402	100	....	....	580	465	115
500	....	....	....	....	....	....	....	540	433	109	....	....	625	500	125	....	....	537	430	109	....	....	620	496	125
600	....	....	....	....	....	....	....	655	525	130	....	....	756	605	150	....	....	660	528	132	....	....	760	608	152
750	....	....	....	....	....	....	....	800	640	160	....	....	925	740	185	....	....	797	636	150	....	....	920	735	185
1000	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1070	852	214	....	....	1230	985	245

Better Merchandising

Two National Events

Refrigeration and Lighting

Food Preservation Program in September and Light's Jubilee in October Call for Local Tie-In Under Leadership of Western Members of Committees

TWO events of major importance confront the electrical industry in the eleven Western states during the forthcoming months. The National Food Preservation Program, bringing together all parties interested in the preservation of foods, refrigerator people, both ice and mechanical, the electric and gas industries, the ice industry, the milk, meat, vegetable and foodstuffs producers, is to be carried into full prominence during the month of September. Light's Golden Jubilee, commemorating the fiftieth anniversary of the invention of the electric incandescent lamp by Thomas A. Edison, is to be the occasion for the greatest international celebration ever organized, during the week of Oct. 21.

In both of these events the Pacific Coast and Rocky Mountain territories are destined to play an important part. It is interesting, first, to realize that out of the experience of Portland, Ore., in conducting a co-operative refrigeration program each year has developed this nation-wide movement which will culminate in September.

Portland gave the example of refrigeration co-operation upon which the nation will now pattern. San Francisco was first to dedicate a show to Light's Golden Jubilee. The West must continue to lead in these two national and even world-wide movements.

National Food Preservation Program

Directing Western activities in respect to the National Food Preservation Program are the following regional directors: For Colorado, New Mexico and Wyoming—George Buck, Public Service Company of Colorado, Denver; for Utah and Idaho—P. M. Parry, Utah Power & Light Company, Salt Lake City, Utah; Washington and Oregon—A. C. McMicken, Portland Electric Power Company, Portland; northern California and Nevada—R. T. Stephens, Pacific Gas and Electric Company; and southern California and Arizona—R. G. Kenyon, Southern California Edison Company, Los Angeles. National headquarters of the program has also sent trained organization men into the field to assist the directors in this work, and aid the local councils in getting started to function properly.

The program is laid out in a plan book that is being distributed by The Society for Electrical Development and the National Electric Light Association. It includes a national essay contest on "Why 50 Degrees Is the Danger Point," in which $25,000 in prizes is to be awarded, the first prize to be a $10,000 model home. Other tie-in material includes booklets, newspaper stories, advertisements in mat form, refrigerator thermometers featuring 50 deg. as the danger point, billboard posters, truck banners, scripts for radio broadcast talks, window cards, milk bottle jackets, and prepared speeches.

The objective of the program is to impress upon the American public: (1) The necessity for keeping perishable foods below 50 deg., (2) the relationship between food spoilage and health, (3) the causes of food decay and bacteria growth, and (4) the vital need for proper all year round refrigeration.

Light's Jubilee

Specific plans for the celebration of Light's Golden Jubilee in the Pacific Coast and Rocky Mountain areas have not been definitely announced so far. Already there have been celebrations dedicated to the jubilee, among which the recent convention of the Pacific Coast Electrical Association at Del Monte is probably the most outstanding. In general, however, tentative plans have been outlined as follows:

In Portland, for example, a general committee composed of the mayor, president of the Chamber of Commerce and other prominent citizens will sponsor the celebration. The newly formed Electric Club of that city is planning to take over the major portion of the work.

Spokane plans an impressive celebration in connection with its new position on the official lighted airways of the nation.

Salt Lake City plans to sponsor improvements in street lighting and to inaugurate new methods of decorative lighting for the week of the jubilee.

Denver plans to make the celebration a civic affair, with the electrical industry aiding in the plans.

In Seattle committees have been formed to consider means of giving due emphasis to that city's part in lighting.

In California machinery is in motion by which the entire civic body of the state may be made conscious of the significant event and participate. The work there is in charge of Walter Carlson, chairman of the Lighting Bureau of the Commercial Section, P.C.E.A., during its past successful year. In this work the individual power companies will participate and organizations such as the Illuminating Engineering Society will act as a technical advisory committee to local communities in their decorative lighting efforts.

In most cases it is yet too early to predict just what part the West intends to play in the jubilee. There is every indication, however, that each city will be stimulated into activity during the week of Oct. 21. Orders have already gone in for plan books, decorative material, advertising services of various kinds, replicas of the original lamp, medals, flashlights, and other material designed for the jubilee celebration.

"ELECTRICANA"

The Department Store Goes in for All Appliances

The new electrical appliance department at Hale Brothers, San Francisco.

DISPLAY and sale of electric appliances is becoming an important feature and item in the thoughts and plans of the department store merchandise manager. Advertising space in national publications, used by manufacturers to tell of their goods, has produced a demand which the retailer in some cases has been quick to sense and answer with supply.

An evidence of this change is seen in the enlargement of the display space in the electric appliance departments of two San Francisco establishments during the past few months. In short, the electrical appliance—man's and woman's greatest time and labor saver—has come out of the corner shelves and is now given a place of prominence with adequate display, advertising and sales personnel.

The two establishments referred to are Hale Brothers in their Market St. store, and the City of Paris store. In the case of Hale Brothers, the smaller stores operated in the chain, four in number, have also been improved as to quality of merchandise sold and display space used.

At Hale Brothers' main store the change was featured by a combined effort of all prominent local jobbers and manufacturers. Active demonstrations of all types of appliances and full-page and scattered display informed the public of the event with an invitation to visit "Electricana" at some time during the week.

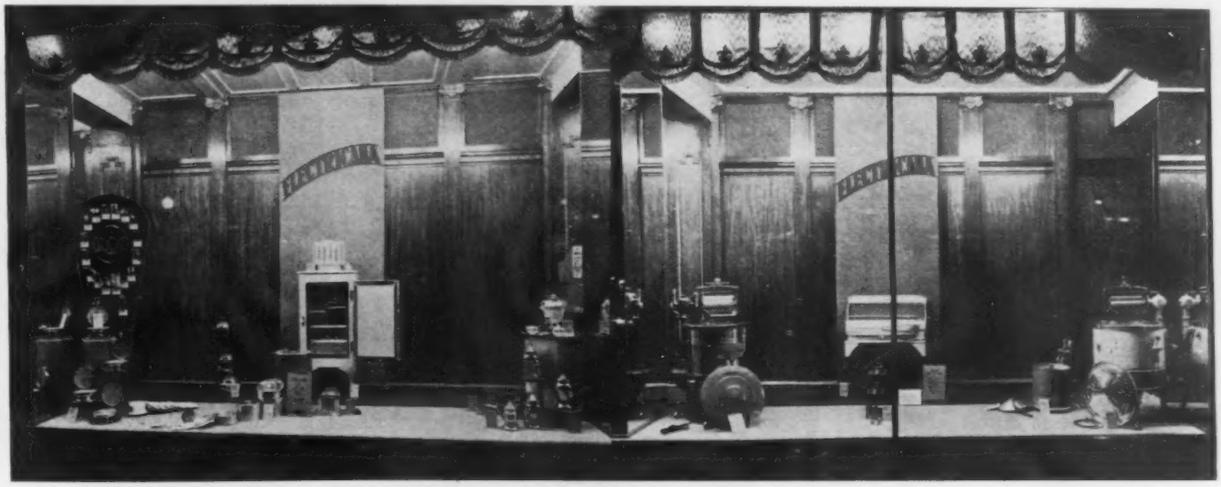
"Electricana," which is the name that has been given the department, was the clever sales idea originated by Miss G. Eschweiler, advertising manager of Hale Brothers' Market St. store. Miss Eschweiler recently joined Hale's organization after many years of intimate contact with the electrical industry in Colorado, with the Electrical League there, and in New York City, where she was with The Society for Electrical Development, Inc. Centering their advertising on the name "Electricana" has set up a definite publicity appeal which will identify the electric appliance department at Hale's in the future.

Results of the first week's sales have been gratifying, and with the exception of demonstrations the activity of the first week is being carried on in a regular routine manner. Plans are now being made to enlarge the department at the San Jose and Sacramento stores. "Electricana" will come into existence in much the same manner that was so successful in San Francisco and the efforts are expected to produce the same results.

The power companies serving San Francisco, the Pacific Gas and Electric Company and Great Western Power Company, also tied in with the opening of the department. Small booths were maintained wherein customers visiting the department might apply for the special appliance rates which are optional with lighting consumers.

A similar department enlargement has been made at the City of Paris. W. Berta, formerly of Charles Brown & Sons, San Francisco, has been employed to manage the department. A change in location from a first-floor corner to the second floor, with an enlarged stock and wider range of appliances, generous publicity in display space and added sales personnel is the initial effort of this concern. Later plans contemplate active demonstration of appliances and other sales features.

The electrical appliance business is coming into its rightful place in the merchandising field. More retail firms will enlarge their departments and broaden their sales activities and the effort will be successful because the field is as yet scarcely touched. The homes lacking the many varieties of electric appliances are legion, not to mention the resale possibilities in homes where they are now successfully used.



It is appropriate that the "moderne" touch of simplicity and precision be given to window displays of electrical appliances as in these two at Hale's.

LET ELECTRICITY DO YOUR COOKING
A REAL SPECIAL
AN EVERHOT ELECTRIC COOKER WILL GIVE YOU A VACATION FROM YOUR KITCHEN
DELICIOUS MEALS-HOT OR COLD
ELECTRICALLY COOKED AT A COST OF A FEW CENTS A MEAL
Everhot
Imagine a portable cooker as simple to use as an electric iron (simply plug into any light socket or service outlet), and yet so complete that it will prepare a full meal for four or six people!
No heat, no odors in the room; all the flavor of the food preserved, never any fear of things burning. And a few cents worth of electricity does a whole day's cooking.
KEEPS FOODS HOT OR COLD
Prepare your foods, place them in Everhot's flavor-fast containers, turn on the electricity until heater is hot. Then switch off the current, and Everhot will complete the cooking and keep your meal piping hot until you are ready to serve.
$8.95
$8.95 Cash, or on terms: $2.20 down and $2.50 per month for three months
REGULAR PRICE $10.95
2 HEAVY ALUMINUM PANS FOR GENERAL USE
The two heavy, two-quart pans that come with your Everhot can be used for every cooking use. Convenient, durable, adding extra value to this splendid cooker.
Get your EVERHOT from any Southern California Edison Company office or from your own dealer

Special envelope stuffers sent out with electric bills used in last year's campaign.

Summer Time Is *Cooker* Time

Outing Appeal of These Appliances Is Capitalized Upon by Dealers and Power Companies in Stimulating Sales Methods

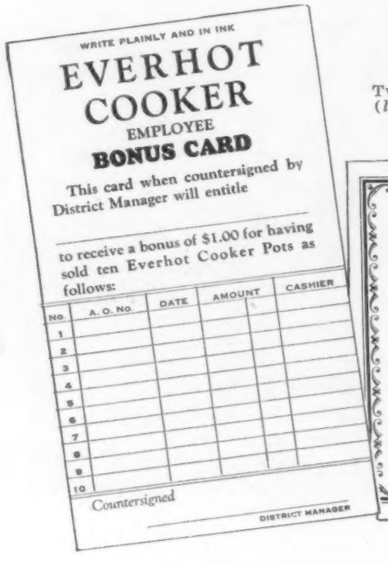
POPULARITY of the cooker pot as a summertime special in appliances does not fade. Manufacturers of these appliances have geared up to higher production and new manufacturers have entered the field with new lines of cookers even, to take advantage of the popular appeal these appliances have during the outdoor season.

Some of the methods employed to bring these to public attention last year serve as guides to those who contemplate similar campaigns this season.

J. C. Hobrecht, for instance, most active merchandiser of appliances in Sacramento, Calif., last year made use of his large windows to portray the vacation idea by dramatic contrast. In one-half of the window was set up a camp table spread with good things brought in the cooker pot from home. The other half of the window showed a woman chained to a cookstove at home. Newspaper advertising also attracted attention to Mr. Hobrecht's establishment as the place to buy relief from summer cooking.

The Southern California Edison Company conducted a unique campaign in many respects last year and from it learned many valuable lessons in addition to selling 3,100 cooker pots. These cookers were sold at $8.95 cash, or $2.20 down and $2.50 per month for three months.

While every effort was made by the sales specialists of the merchandising department to do as much as possible in furthering this campaign, the means of actually carrying this sales story to the public rested upon the non-selling employee group. Every employee was given $1 commission for every sale, and every district organization set indi-


WRITE PLAINLY AND IN INK

EVERHOT COOKER

EMPLOYEE

BONUS CARD

This card when countersigned by District Manager will entitle

_____

to receive a bonus of $1.00 for having sold ten Everhot Cooker Pots as follows:

NO.	A. O. NO.	DATE	AMOUNT	CASHIER
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Countersigned _____

DISTRICT MANAGER

Two new features were the employee bonus card (*left*) and the certificate to members of organizations taking advantage of the offer, shown below.

GOOD FOR $1.00 CASH CERTIFICATE Nº 4801

This Certificate, *when properly endorsed, entitles the bearer to purchase one* EVERHOT ELECTRIC COOKER *at* $1.00 *less than the regular selling price, from any office of the Southern California Edison Company.*

Buyer _____ MEMBER SIGN HERE

Name of Organization _____

By _____ SECRETARY SIGN HERE

SOUTHERN CALIFORNIA EDISON COMPANY

Authorized by _____ EDISON DISTRICT MANAGER

J. C. Hobrecht, of Sacramento, made his window point a dramatic contrast between the carefree vacation camp table and the housewife chained to her cookstove during the summer hot weather.

vidual sales quotas which tended to put every employee on his or her toes. Practically all of the 3,100 cookers were sold under this arrangement.

As an additional inducement to increase employee sales an employee bonus card was prepared on which it was stated: "This card when countersigned by district manager will entitle (name of employee) to receive a bonus of $1 for having sold ten Everhot cooker pots as follows:" Following this was a space for entering the appliance number, the date, the amount, and the cashier's signature. This particular measure to increase the number of employee sales has proved very effective. This bonus of $1 was in addition to the regular $1 commission paid for every sale. No premiums of any kind were used and the entire sales urge was made upon the basis of a bargain price.

For the first time in its merchandising history, the Edison company resorted to billboards to help put over a sales idea. Thirty-one boards in ten districts were used during the month of July. The cooker and the price of $8.95 were featured in the billboard advertising. The signature of the Southern California Edison Company was followed by the phrase, "or your dealer."

The standard window trim used by the Edison company in its district offices.

A six-page stuffer attractively laid out was sent out with electric bills to more than 250,000 residence consumers.

To make it possible for the district offices to have a uniform window display a sample window was set up and photographs were then sent out to every district office together with a supply of cards, crepe paper, etc., necessary to prepare the window trim properly.

In an attempt to have this campaign reach women's clubs, church organizations, boy scouts and the like, a plan was instituted which provided that these organizations could sell a certificate, which the Edison company had prepared, to their own members for $1. This certificate entitled the member to buy a cooker at $1 less than the selling price, which put a dollar in the treasury of the organization and at the same time helped spread the sale of cookers. No employee commission was paid on this type of sale.

Contrary to expectations, this plan was not accepted by the organizations as readily as anticipated. "It apparently requires considerably more selling ability to sell this certificate plan to the various organizations that we were able to provide at the time," declared one official of the sales department. However, the plan is still considered a good one. The company has shelved it for the time being but has not lost track of its salesmaking possibilities for some future drive.

This year's campaign is being varied considerably. The price is raised to $9.95 and a premium of a thermic jug is being offered. The certificate plan is omitted. Again, however, the vacation and outing appeal is featured in the stuffers sent out with all electric bills. A feature of this year's offer is that it is for cash for the entire amount, advertised as a "cash and carry" proposition.

For the first time billboards were used by the Edison company in a special appliance campaign.

Can a Dealer in a Small Town

COMPETE IN FLOOR LAMP SALES?

One Dealer Tells How He Does It In Spite of Nearby City Stores

"WHAT is the small-town dealer's opportunity in the merchandising of floor and table lamps?" was the question put to G. M. Halliday, manager of the Walsenburg Electric Supply Company, Walsenburg, Colo., a town of about 6,000 persons located within the trade territory of a metropolitan community to which many of the Walseburg residents motor to shop for lamps and other varieties of merchandise because they assume that the choice is larger and the prices equal if not less.

Mr. Halliday declared that it behooved the small-town dealer to carry a stock of lamps and shades regardless of how much trade went to the city because he must be in a position to supply the local demand when the demand arose. However, the variety must necessarily be small and the volume of purchases likewise must be small.

"We have found it the best policy to buy a few shades at a time but to buy them often," Mr. Halliday explained. "The reason is two-fold. In the first place it prevents us getting in a stock of merchandise that does not move fast and it eliminates much of the possibility of being 'stuck' with several dozen shades and standards which we would have to sell at less than cost in order to dispose of them. Some dealers, as well as some representatives of the wholesale houses, advise a mark-up of 150 per cent on lamps, as a means of enabling the merchant gradually to reduce the retail price and eventually dispose of the stock at a price that permits at least a small profit. We do not mark up much, but do set the retail price at twice the wholesale price. The freight and other charges are included in the added 100 per cent. This is the limit of the amount we can safely mark up the goods in a small town.

"The second reason for our buying methods is that they permit us to have something new at frequent intervals.

"In our buying, we select only the latest styles and never do we get two alike, for it is woman nature to want to buy a lamp or a shade that is different from that of any other woman in the community.

"We have another good merchandising plan that keeps interest in lamps to a high pitch. We have some customers who wish us to let them know immediately when we get a new stock of lamps in. These we telephone, and they come down shortly after receiving the message to see what the new styles are like. Naturally they pass the word along to friends and the friends come in. This plan applies particularly to shades.

"New lamps and new shades are to the home what a new necklace is to a woman's dress or a new necktie is to a man's appearance: they brighten up those things which already are old. Hence one of the opportunities of the small town dealer is in the sale of replacement shades, as we might term them.

"Our future policy will be to cater to the desire of the housewives for new shades. In this we shall have to depend largely upon the moderately priced shade for our sales. The less expensive the original shade the more frequently and sooner will the customer replace it with a new one.

Direct Mail Carries Range Campaign for Sierras Company

WITH only three full-time salesmen and without newspaper advertising, The Southern Sierras Power Company carried through its second successful range campaign recently with 135 ranges, fourteen water heaters and seven refrigerators sold. Until last year this company had conducted no special range campaigns. This campaign was carried on into the period usually considered poor selling time, namely the beginning of warm weather, in Imperial Valley. In spite of this, quotas were made. All advertising done was in the form of envelope enclosures, one individually mailed broadside, uniform window trims, truck and car signs and counter literature.

Menu cards, broadsides, pamphlets, and stuffers furnished by the manufacturer.

Steel shelving and steel framed showcases put all package stock and parts in plain sight. This aids in assembling an order.

Steel counter with showcase below serves double purpose. Racks on ends of shelving speed selection of particular fittings or tools wanted.

Equip and Arrange for *Quick Turnover*

Stubbs Electric of Portland Organizes Facilities to Reduce Overhead and Increase Speed and Accuracy in Handling Supplies

SPEED and efficiency in the handling of supplies in and out are so considered in the design and arrangement of the new quarters of the Stubbs Electric Company at Park and Couch Sts., Portland, as to cause competent observers in the jobbing field to say that this new store is one of the most effectively arranged in the United States.

The quarters are in a two-story building 100 x 100 ft. fronting on Park St., with a side entrance at the rear on Couch St. The ground floor carries the display room, counter and showcase and shelves for filling broken package orders, general and private offices, salesmen's offices, storage space for pipe and wire, and the shipping room. The second floor is given over to storage of lighter goods in standard packages and the radio service department.

Goods are received from the freight depots by truck at the Couch St. entrance, where the truck is backed into the building, and the heavy material, which is stored on the first floor, is unloaded into the alcoves and bins provided for the different sizes. In the case of packaged goods, the truck is raised on an elevator to the second floor, where the different classes of material are allotted floor space.

A spiral chute and a small elevator facilitate delivery of packaged goods to the shipping department or broken packages to the local delivery room.

The main entrance on Park St. leads into the combined display and sales room, 51 x 23 ft., flanked on the left by the general office, 48 x 27 ft., and on the right by salesmen's offices, with a small radio display room toward the rear. Across the back of the main display room is a steel-framed counter and showcase, behind which is a space 46 x 44 ft., occupied by Lyon steel shelves containing the broken package goods for counter purchases and small local pick-ups.

The rear 30 ft., across the entire width of the building, is given over to the receiving room, shipping room, and storage space for pipe and wire referred to.

Storage of standard package goods is maintained on the second floor. A radio test room is also located on this floor.

The shipping department loads trucks directly from its floor. A spiral chute brings quick service from the second floor.

News of the Industry

Frank A. Leach Resigns From P. G. and E. Co. and Is Succeeded by Paul M. Downing

AUGUST 1 marks an important change in the official personnel of the Pacific Gas and Electric Company, San Francisco, for on that date Frank A. Leach, Jr., for the past six years vice-president and general manager, retires from that office and Paul M. Downing, since 1920 vice-president in charge of electrical construction operations, takes up the duties Mr. Leach has relinquished.

After a service of 31 years with the company, Mr. Leach feels that he has earned the right to a rest and has resigned in order to play awhile, as he phrases it. In accepting his resignation, the board of directors paid him the following tribute:

"The services of Frank A. Leach, Jr., beginning with his employment as a junior clerk and continuing through the offices of assistant manager and manager of the East Bay district, assistant general manager, vice-president in charge of public relations, and finally first vice-president and general manager, have been marked by constancy, loyalty and devotion and stand forth as an example and a model."

Mr. Leach became assistant general manager of the company in 1920, when

FRANK A. LEACH, JR.

he was transferred to San Francisco from the East Bay territory where he had been division manager. A short time later he was appointed vice-president in charge of public relations and service, and in 1923, upon the death of John A. Britton, Mr. Leach was elected vice-president and general manager.

Mr. Downing's connection with the power company dates back to 1903 when he became superintendent of substations for the California Gas & Electric Corporation, and operating engineer for that company and for the Pacific Gas and Electric Company, which later took it over. In succession he became division superintendent, operating engineer, and engineer of operation and maintenance. The latter position he held for nine years until his appointment as chief engineer of the electrical department. In January, 1920, he was made vice-president of the company in charge of electrical operation and shortly thereafter the duties of supervision of electrical construction were added.

PAUL M. DOWNING

Mr. Downing is a pioneer in the electrical industry. He began his career as dynamo tender with the Tacoma Light & Power Company, Tacoma, was assistant motor inspector and powerhouse operator for the Market Street Railway Company, San Francisco, and in 1897 became station superintendent of the powerhouse at Blue Lake City, Calif., one of the first hydro plants in California. He later was associated with John Martin as agent for the Stanley Electrical Manufacturing Company, became chief electrician for the Standard Consolidated Mining Company, Bodie, Calif., served as manager of the Colusa Gas & Electric Company, Colusa, and as division superintendent of the Bay Counties Power Company, San Francisco, in charge of transmission and distribution of power.

Mr. Downing is an ex-president of the Stanford Alumni Association. He served as captain of the Stanford football team in 1894 and was graduated with the pioneer class of 1895, of which President Hoover was a member.

Both Mr. Leach and Mr. Downing have taken an active interest in the affairs of the electrical industry, and each has served as president of the Pacific Coast Electrical Association, Mr. Leach during the 1924-1925 administration, and Mr. Downing during 1928-29.

Purchase of Boulder Dam Power Guaranteed

Purchase of the maximum power to be developed by Boulder Dam was guaranteed by representatives of the Los Angeles Bureau of Water and Power, the Southern California Edison Company, Los Angeles Gas and Electric Corporation, and The Southern Sierras Power Company in a conference with Dr. Elwood Mead, United States Commissioner of Reclamation in Los Angeles June 25-26.

Although details of the meetings of the officials were not disclosed, it was learned that the applicants for power contracts are divided in their opinion on the "falling water" policy of the government.

The Southern California Edison Company favored construction of a hydro-electric plant by the purchasers, while the Bureau of Water and Power preferred that the government build and operate the generating system, it was said.

George C. Wood, executive vice-president of the Edison company, said that his company "either in conjunction with other agencies or by itself would agree to utilize all the power of the falling water at Boulder Dam and to pay therefor the maximum price which can be paid without financial loss." The Los Angeles Gas and Electric Corporation official stated that that company was willing to participate in the distribution of power from the river. The Southern Sierras Power Company's representative stated that that company was ready to take power up to the full capacity of its lines at the maximum price at which it could generate power at its own plant.

Commending the co-operative attitude with which the power companies have met the issue, Dr. Mead predicted that "under favorable conditions, actual construction will begin on Boulder Dam within the next ten months."

Delegates of the four upper basin states of the Colorado River are expected to meet in September in Denver to allot 7,500,000 acre-ft. of the Colorado River, as made necessary when President Hoover signed a proclamation making effective the six-state Colorado River Compact. The upper states, Colorado, New Mexico, Wyoming and Utah, agreed six years ago on taking 7,500,000 acre-ft. of water from the river.

Recommends That City of Seattle Buy Puget Sound Company's System

THAT the City of Seattle proceed to acquire the entire holdings of the Puget Sound Power & Light Company within the city, together with much of its generating system, has been recommended in a report of the Light Department's activities and earnings for 1928 filed with the City Council by J. D. Ross, superintendent of lighting. He urged that the private company be taken over by condemnation proceedings in the courts, as a means of cutting out expensive duplication of expenditures, and declared that the City Light Department rate could be cut in half if this program were followed.

Mr. Ross declared that the two systems could easily and successfully be coupled and that the money for the purchase of the private system could be financed by a large issue of utility bonds against the earnings of the combined system.

The particular reason for his suggestion at this time is that an underground system is now being asked for the Denny regrade district, including First Ave. South, and on such streets as soon must be paved in order that ducts may be in ahead of paving. Such an underground system will add a cost for City Light of over $3,000,000. It is assumed, Mr. Ross states, that the competing company will plan an equally large system, and will add a duplicate $3,000,000 to be increased in each succeeding year, all of which cost must be taken over and paid for by City Light sooner or later.

Mr. Ross sets forth in his report that acquisition of the Puget Sound Power & Light Company's holdings in the city would end the long and highly expensive fight which he says has been waged between them and that this would automatically increase the salability of all City Light bonds in the future.

He calls attention to the tremendous outlay by both City Light and its competitor for a double overhead and double distribution systems, with two entire sets of substations, where only one is necessary.

"City Light is now competing with other Coast cities for the bringing of industry," Mr. Ross states in his report. "The City of Tacoma has a monopoly and its costs of distribution are thus lower than those of Seattle, where the cost is doubled by having two systems and the revenue is cut by being divided between the competing concerns."

A. W. Leonard, president of the Puget Sound Power & Light Company, in discussing the report of Mr. Ross, declared: "My company has not the slightest intention of selling either its distributing system in the City of Seattle or any of its power plants to the Seattle municipal lighting system." He said that he did not believe that the taxpayers of Seattle will take Mr. Ross' suggestion seriously. He agrees wholeheartedly with Mr. Ross's statement that competition in the light and power industry is unsound, uneconomic and causes higher rates, but declares that it is equally well established that private operation is invariably cheaper than political operation.

"I am not surprised," said Mr. Leonard, "that Mr. Ross wishes to add to the city's system some of our power plants, plants that are economically constructed and are capable of being operated at low cost. This is very apparent from Mr. Ross's own statement concerning the Skagit plant before the Municipal League on May 14 of this year, in which he said that this plant had cost the city and the consumers of electrical energy $10,000,000 in excess of what it should have cost. None of the plants of this company which Mr. Ross seeks to acquire is burdened with any excess costs whatever."

Besides recommending the purchase of the power company's holdings, Mr. Ross, in his report, recommended an ambitious program of development on the Skagit River. He urges that work now under way at Diablo be speeded with all possible dispatch, because all the power made possible by the new Diablo Dam will be sold in about five years. He also urged the clearing of the Ruby Basin immediately as this work will require about five years, and the full development of 1,000,000 hp. which can be developed on the Skagit project, according to Mr. Ross, will be needed to supply demands for power within the next fifteen years.

Gross earnings of $4,872,636.97 were reported by Mr. Ross for the Light Department in 1928. This was a gain of $510,893.71 over the previous year, he said. During the 24 years that the City Light Department has operated, the report showed, operating revenues have amounted to $42,015,642.02. During that time its expenses have been $19,634,267.23; its interest payment, $6,709,746.54; its depreciation $6,513,-263.95, giving it a grand total surplus of $9,158,364.30, of which $992,305.77 was marked up during last year.

New Uses for Neon in Sign Lighting of Fox Theater, Seattle

TWO new departures in Neon tube lighting have been introduced in the sign illumination at the Fox Theater, Seattle. In the main theater "Fox" sign a three color effect has been produced by outlining the letters with double tubing of blue Neon and double tubing of red Neon and flashing first the blue, then the red, and then both together. The sign is 48 ft. high and 10½ ft. wide with 10-ft. letters and is bordered with a double row of orange amber, inside frosted incandescent lamps, which with blue Neon scrolls at the top, bottom and sides serves to set off the three-color flashing letters in spectacular fashion. The sign is double-faced, and its position on an angle across the sidewalk on the corner makes it visible from four directions.

For the signs used on the marquee interchangeable letters in red Neon tubing have been made up and are changed weekly with the changing of the shows. This is one of the first uses that have been made of interchangeable Neon tube letters. The marquee signs are allowed to burn 24 hours a day because of the added visibility the lighting affords for daytime advertising.

Two California Companies' Rates to Be Investigated

The California Railroad Commission has returned to its calendar the cases involving the rates of the Pacific Gas and Electric Company and the Great Western Power Company. The hearing of the former company has been set for Aug. 27, and for the latter, Aug. 29.

On June 4 an informal hearing was held upon notice to these utilities and others to show cause why proceedings should not be instituted inquiring into the reasonableness of their charges. The showing of these two companies upon that date being satisfactory to the commission, that body has determined that proceedings should be formally started to inquire fully into their present rate schedules. The cases which are restored to the calendar are the complaints originally made by the Cities of San Francisco, Oakland, Berkeley and Piedmont, the commission at the same time having instituted investigations on its own motion to broaden the scope of the complaints as filed by the cities so as to include the entire systems of the companies.

Modesto District Contracts for San Joaquin Power

An agreement has been entered into between the San Joaquin Light & Power Corporation, Fresno, Calif., and the Modesto Irrigation District, Modesto, Calif., whereby the power company will supply the irrigation district with standby service and power during the district's low water periods. A second contract has been entered into with the Turlock Irrigation District, Turlock, Calif., under the terms of which the Turlock district agrees to permit the San Joaquin company to sell to the Modesto Irrigation District power now being purchased by the company from the Turlock district at the Don Pedro plant.

Under the agreement the company is allowed to use the Turlock district's transmission lines to deliver the power to the Modesto district and in the event that the power being purchased by the San Joaquin company from the Don Pedro plant may be insufficient to meet the need of the Modesto district, then the company will be permitted to use the Turlock district's lines to deliver to Modesto additional power from the San Joaquin company's system. The power is being furnished by the San Joaquin company at prices set forth in its rate schedules on file with the California Railroad Commission, which formally has approved both contracts.

The consummation of these agreements brings to an end the efforts of the Modesto Irrigation District to secure power in addition to its share of the power generated at the Don Pedro plant built by the Modesto and Turlock Irrigation Districts. The Modesto district had filed a complaint with the California Railroad Commission against the San Joaquin Light & Power Corporation and the Pacific Gas and Electric Company, alleging that both companies had refused to serve it with energy and asking the commission to order the companies to do so. The district also had announced that it would build a 7,500-hp. Diesel engine electric generating plant and had called for bids on the first 1,500-hp. unit. (Electrical West, June 1, p. 604.)

With the closing of the contracts the railroad commission has dismissed complaint of the districts against the two power companies and the district has agreed not to build the Diesel engine standby plant.

Traffic Director Takes on New Functions

THE elimination of many unsightly posts from the streets of Pasadena, Calif., has been accomplished by incorporating in one post, stop and go signals with red and green signal lights and complete semaphore illumination, illuminated street name, bell signifying traffic change, 24-hour traffic flasher, as well as a fire alarm box and police telephone system. In one case six posts have been replaced by this one standard.

The officer is pointing to the fire alarm box, mounted at convenient height; a door in the box on the opposite side gives access to the police telephone.

The cost of operation of these signal posts in Pasadena has been found to be 1 cent per hour at a rate of 5 cents per kw.-hr. The posts are manufactured by the Waterhouse Signal Corporation, of Pasadena.

North River Project Work Started in Washington

Following two years of preliminary work, workmen have begun to clear the dam site for the North River hydroelectric project to be developed in Pacific and Grays Harbor Counties, Wash., by the Western Washington Light & Power Company, a subsidiary of the Federal Light & Traction Company. The entire project will be constructed by Sanderson and Porter. The development is expected to have an important effect upon the industrial expansion of Grays Harbor and Willapa Harbor areas.

The project calls for construction of a $3,500,000 plant and a transmission line from Aberdeen to Raymond. The dam, 120 ft. high and 400 ft. long at the crest, will contain 54,000 cu.yd. of concrete and will create a reservoir covering 7,600 acres. Below the dam will be two reinforced concrete buildings, a gate house 75 ft. long and 23 ft. high, and a power house in which two 12,500-hp. turbo-generators will be installed, with provision for a third of the same capacity when needed. The transmission line, which will be erected on steel towers and carry 66 kv., will be from 30 to 35 miles long, with two 5½-mile branches from the power to the main line.

Vallejo Utility's Rates Reduced 18 Per Cent

A reduction in the rates charged by the Vallejo Electric Light & Power Company, Vallejo, Calif., has been ordered by the California Railroad Commission following hearings recently concluded. Effective Aug. 1, 1929, the new rates will mean a reduction of approximately $50,000 a year to consumers in Vallejo and vicinity and will average about 18 per cent less than those now prevailing. A 7 per cent return is held to be adequate for a utility such as the Vallejo company.

Under the order, top block domestic rates are fixed at 4½ cents per kw.-hr., which is in addition to a 50-cent service charge, and graduate downward by blocks, the lowest block being 1 cent per kw.-hr. Commercial lighting remains at 5 cents per kw.-hr. for the first block, but the second block was reduced from 4 cents per kw.-hr. to 3 cents per kw.-hr.

The new rates, in form, will follow closely those of the Pacific Gas and Electric Company but, according to the order, "they are about 10 per cent under the level of corresponding rates charged by that company. "Following this statement in the opinion there appears parenthetically the statement that "a rate proceeding respecting the electric rates of this utility (Pacific Gas and Electric Company) is on the commission's calendar for consideration."

Both companies were included in the long list of California utilities whose rates the commission upon its own motion decided to investigate.

Federal Power Commission Activities and Recent Decisions Reported

Washington Correspondence.

IT IS not within the authority of the Federal Power Commission to reject an application for power development on the ground that it may mar scenic beauty, in the opinion of the chief counsel of the Federal Power Commission. In this opinion the solicitors of the Departments of War, Interior and Agriculture concur.

The question was raised in connection with the application for license of the Cumberland Hydroelectric Power Company covering a project at Cumberland Falls, Ky. The development was opposed on the ground of alleged injury to the scenic features of the falls. The corps of engineers and the staff of the Federal Power Commission have recommended the granting of the license. They take the view that scenic beauty will not be impaired and call attention to the fact that the power company will build the necessary roads to make the falls available to a larger number of persons. Less than 1,000 persons visit the site annually under present conditions.

The chief counsel says that the provision of the law that a project "shall be best adapted to a comprehensive scheme of improvement and utilization for the purposes of navigation, of water power development and of other beneficial public uses," was intended only to secure a comprehensive plan whereby all such uses may be effected. While the commission may issue the license with conditions for the preservation of scenic attractions, they must be in harmony with the plan of power development. If this decision is adopted by the commission it will have a far-reaching effect upon other proposed projects where scenic beauty is being urged as a reason why the application should be denied.

A favorable report has been submitted by the Forest Service in connection with the proposed development of power on the Lewis River near Portland, Ore., by the Inland Power & Light Company. The original application for the preliminary permit contemplated the construction of four dams and power houses to have an installed capacity of 375,000 hp. Later an understanding was reached under which rights would be sought only on the two lower sites. The Forest Service report covers that part of the project known as the Ariel and Yale sites. This will permit the installation of 170,000 hp.

The commission has approved the proposal of the Inland company to lease three of its projects to the Pacific Power & Light Company. The projects involved are on the South Fork of Clearwater River in Idaho, on the East Fork of the Wallowa River in Oregon, and on the Clearwater River in Idaho.

No insurmountable obstacles to the adjustment of conditions under which power development may proceed at Flathead Lake exist. This is the opinion of Major Glen E. Edgerton, chief counsel of the Federal Power Commission, who recently returned from a personal inspection of the project. He believes it to be entirely possible to protect the agricultural interests in the vicinity of Kalispell in the Flathead Valley, Mont. Sufficient data have been gathered in the field to allow an exact determination of the facts of the different lake levels. This will permit the commission to fix an upper level which will prevent damage to agriculture. In addition to the topographical surveys, studies were made of underground water conditions. The preliminary examinations which have been made in connection with this project have been unusual in their extent and thoroughness. The commission has under consideration an application for this site from the Rocky Mountain Power Company.

The chief counsel of the commission is studying the Colorado River situation with a view to the formulation of a formal opinion covering the status of more than 30 projects on that river which have been held in abeyance pending the settlement of the Boulder Canyon question. Doubt exists as to whether the proclamation of the president, making effective the Boulder Canyon Project Act, automatically raises the ban imposed by Congress upon all other Colorado River projects. Some are of the opinion that no action on Colorado River applications can be taken until the Secretary of the Interior has concluded contracts for the sale of the power.

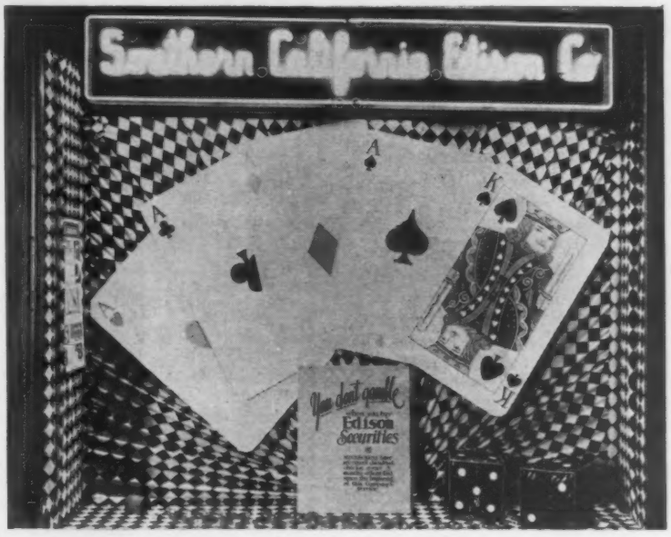
The company having indicated its intention to undertake no development at this time of a site on the Grande Rondo River in Wallowa County, Ore., the preliminary permit issued to the Eastern Oregon Light & Power Company has been canceled.

Failure of the American River Water & Power Company of Auburn, Calif., to satisfy the commission as to its ability to finance a project on the North and Middle Forks of the American River has led the commission to reject its application for a preliminary permit, although 30 days were allowed for the company to appeal from the decision.

City of Seattle Subject to Water Power Tax

The City of Seattle, through a license under the Federal Water Power Act in connection with its Skagit River development, is subject to the annual fees imposed in the licensing act passed by the 1929 legislature, which provides that every person, firm and private or municipal corporation claiming the right to use water for power development shall pay in advance an annual license fee based upon the theoretical water power claimed. The rate is fixed at 10 cents per horsepower up to 1,000 hp., 2 cents per horsepower from 1,000 to 10,000, and 1 cent per horsepower in excess of 10,000. The act became effective July 1 of this year, and payments are to be made on Jan. 1 of each year.

Even Better Than Gambling With a Good Hand



THE Southern California Edison Company uses this novel window display in its Los Angeles and district offices to further the idea of thrift and safety in the purchase of Edison company securities. The giant cards used for the poker hand are each 28 x 42 in. in size. Seeming to emerge from the shaker on the floor of the window are 300 dice of various colors and sizes.

Substation and 13-Kv. Line Planned by W. W. P. Co.

Important electric service construction projects planned for the near future by The Washington Water Power Company include a new substation for the Hollywood district in Spokane with three 13-kv. lines to augment city service lines and the building of a new 13-kv. line, fourteen miles in length, from the Nine Mile power station to connect with the Foshay system at Deer Park, Wash., according to announcement of Miles W. Birkett, vice-president and general manager.

The new Hollywood substation will be of the outdoor type, 10,000-kw. capacity, to step down power from a 60-kv. line from the Nine Mile power station.

Construction crews of the company now are completing a new 50-mile 110-kv. transmission line from the Chelan power station to Stratford to augment service for irrigation and the electrified section of the Chicago, Milwaukee, St. Paul & Pacific Railway, in addition to effecting a more complete tie-in of the Chelan and Oroville plants with the Spokane River system of the company.

Denver Granted Permit for 79,000-Hp. Power Project

Issuance of a preliminary permit by the Federal Power Commission to the City and County of Denver covering a 79,000-hp. project at the Two Forks dam site on the South Platte River, is believed to be the first step on the part of Denver's water commissioners to launch that city into the power business.

The Two Forks organization, according to Malcolm Lindsey, attorney for the commissioners, merely gives three years' time for exploratory work and contemplation of development possibilities. A further permit, involving water rights and dam site at Eleven Mile Canyon, will be applied for as soon as surveys now being made are completed. Eleven Mile is near Lake George, Colo., and nearer headwaters of the Platte than Cheeseman reservoir, the present principal source of Denver's water supply.

Cheeseman Lake has a capacity of 80,000 acre-ft., which is not regarded as a sufficient impoundage to insure Denver an adequate water system ten years hence. The Two Forks and Eleven Mile projects are designed, according to the commissioners, to conserve flood waters at sporadic intervals and add about 40,000 acre-ft. to the city's reserve. Present plans contemplate the construction of three reservoirs with six power plants, two at each location to develop a total of 59,250 kw. Sale of this current has been urged as a means to retire outstanding water bonds and furnish the City and County of Denver with permanent revenue.

The Two Forks and Eleven Mile projects were originated in 1925 by James H. Causey, Denver investment banker, who proposed to the Board of Water Commissioners that he finance the chain of hydro-electric plants as a municipal enterprise. It is not known whether the Causey interests are concerned in the present activities along these lines.

Denver acquired its water system in 1918 when the city purchased the Denver Union Water Company for $14,000,000, indebtedness, equipment and distribution system. Since that time various plans to put the business on a profitable basis have been promoted.

National Essay Contest Has Pacific Coast Winner

First prize of $150 in a nation-wide Light's Golden Jubilee essay contest sponsored by the Public Relations National Section of the N.E.L.A. has been awarded to W. M. Fisher, assistant paymaster, Los Angeles Gas and Electric Corporation.

W. M. FISHER

The essay contest was open to all employees of member companies of the N.E.L.A., except to officers, managers, department heads and those who specialize in the sale of light.

The subject matter of Mr. Fisher's winning essay consists of the history of light, its successful stages of development, the invention of the incandescent lamp by Thomas A. Edison, what modern lighting means to our present civilization and the electric light and power industry, and what the electric light and power industry has contributed to the nation.

One hundred and sixty-two essays from all over the country were entered in the contest. William T. Galloway, Middle West Utilities Company, Chicago, won second prize of $75 and Travis L. Bogue, of Tulsa, Okla., was awarded honorable mention.

The judges were Earl Whitehorne, McGraw-Hill Publishing Company; D. L. Gaskill, secretary of the East Central Division of the N.E.L.A.; and Miss Sophia Malikcki, of the Midwest Utilities Company.

Mr. Fisher was winner of first prize in the three-minute speaking contest held at the annual P.C.E.A. convention last year.

Ideas for Light's Jubilee Offered in Two Books

Two books have been issued covering the story and plans for Light's Golden Jubilee.

The first book, consisting of sixteen pages and released by the general committee, is the official Jubilee Book and gives an authentic story of the Jubilee as well as information and data on the accomplishments of Thomas Edison. This book should prove of particular interest to those communities planning to take part in this world-wide tribute to Edison. The books are priced at 5 cents each for a minimum order of 25, and should be ordered from the committee.

The second publication, entitled "Suggestions for Local Participation in the World-Wide Tribute to Thomas A. Edison," is published by the National Electric Light Association, and is a 44-page book of suggestions for local celebrations. This book is divided into three parts. The first states briefly the high spots of the Jubilee, what it stands for, and why it should be carried out. The second gives suggestions in picture and text form as to organization, who should be interested, what towns of various sizes can do, and supplies ideas in connection with methods of celebrating the tribute. The third lists the material available for such celebrations. This book should be ordered from the Commercial Section of the National Electric Light Association, 420 Lexington Ave., New York City. The following prices have been established: 1 to 9 copies—25 cents each; 10 to 99 copies—20 cents each; and 100 and over—15 cents each.

Power Project on Little Colorado River Planned—Application has been made to the Federal Power Commission by the United Verde Copper Company for a preliminary permit covering a 61,500-kw. development on the Little Colorado River in Coconino County, Ariz. It is proposed to construct a dam and reservoir on the Tolchico site with other dams at Grand Falls, Coconino, Lower Falls, and Black Falls. The power is to be used for the mining and smelting operations of the United Verdi Company, but the company offers to sell current for public utility use in the vicinity of its operations.

Bids for Centralia Power Project to Be Opened Aug. 13—Bids will be opened Aug. 13 in Centralia, Wash., by the City Council for equipment in connection with a municipal hydro-electric power project on the Nisqually River for which a $1,000,000 bond issue recently was voted. Specifications include two 2,900-hp. hydraulic turbines, two 2,500-kva. electric generators, and eight 1,667-kva. transformers. W. J. Roberts is chief engineer and Glen Dunbar is electrical engineer for the project.

Public Service Co. Buys Colorado Utility

The purchase of the equipment and distribution system of the Gilpin County Light, Heat & Power Company, has been announced by the Public Service Company of Colorado, Denver. For more than 30 years the Gilpin County company, of which Thomas B. Stearns was president and principal stockholder, supplied current to the mining district comprising Central City, Black Hawk, Nevadaville and Russell Gulch. An increase in power consumption of more than 100 per cent in Gilpin County is attributed to a mining revival in that district. With the purchase the Public Service Company has taken over about fifteen miles of power line.

C. J. Hancock, manager for the Public Service Company at Idaho Springs substation will have supervision of the property, and W. E. Scott will continue as manager at Central City.

Oregon Rules on Appraisers of Utility Properties

Under a recent ruling of the attorney general of the State of Oregon, reports on the valuation of utility properties made by real estate firms, development companies, lawyers, and other persons, if made a matter of record, establish prima facie evidence that the unprofessional individual or firm rendering such report did so in violation of the law which provides that any person engaging in the business of appraising utility property for rate-making purposes must be a registered engineer.

It is believed that the opinion will have a tendency to check much of the litigation which in the past has arisen from controversy involving valuation findings of inexperienced and unqualified appraisers which have been used for the purpose of contesting valuations found by the expert engineers of the regulatory body.

Edison Company to Lay Two Cables Across Channel

Two submarine cables to carry 11-kv. lines will be laid by the Southern California Edison Company in order to fulfill a contract awarded it by the Ford Motor Company for an original installation of 1,000 kw. for its new assembly plant at Long Beach, Calif.

Electricity will be delivered to a substation at the new plant at 11,000 volts from two direct circuits from the Edison company's Long Beach steam plant, situated only 6,000 ft. from the site of the Ford plant across the Cerritos Channel. The voltage will be reduced at the substation to 2,300 volts for service within the plant.

The Edison company has been granted permission by the War Department to lay the cables, and they are to be laid 37 ft. below the low water line in the channel to insure complete clearance for steamer traffic.

Pacific P. & L. Co. Plans Plant at Joseph, Ore.

Material is being ordered as rapidly as possible by the Pacific Power & Light Company, Portland, Ore., for the hydro-electric power plant it is planning to build at Joseph, Ore. The new plant will be erected on the site of an old plant which was part of the system of the Enterprise Electric Company when that property was acquired by the Pacific Power & Light Company.

The new building will be of brick and will house a 1,500-hp. Pelton wheel direct connected to a 1,250-kva. 2,200-volt generator. Water will be conducted to the plant by a 48-in. wood stave pipe line a little more than a mile in length. It is planned to have the plant ready for operation before the end of the present year, as it is badly needed to supplement the present Wallowa Falls plant, which for nearly two years has carried the greater part of the load on the Enterprise system.

Hydro Plant on Nisqually River Planned—Permits have been issued by the Washington Hydraulics Office to the Pacific Development Company, Olympia, Wash., granting the use of 1,050 sec.-ft. of water from the Nisqually River in the vicinity of McKenna, on the boundary line between Pierce and Thurston Counties, Wash., for a hydro-electric power project estimated to cost $1,500,000. Approximately 26,820 hp. is to be developed, according to Lars Langloe, president of the company, and the plant is expected to be finished in October, 1930. A 230-ft. concrete dam 4 ft. high is planned to divert the water into a nine-mile canal leading to the power plant.

British Columbia Electric Company Buys National Utilities Corporation—The British Columbia Electric Railway Company has bought the National Utilities Corporation, which owns and controls the following electric light and power plants on Vancouver Island: the Port Alberni power and light plant, Cumberland & Union Waterworks Company, Royston Light & Power Company, and Parksville Light, Power & Heating Company. As the result of this purchase the British Columbia Electric Railway Company now will control power in seven of the twelve municipalities on Vancouver Island.

Power Company Plans Dam On Kootenay Lake—Construction of a dam on Kootenay Lake at Granite, B. C., is contemplated by the West Kootenay Power & Light Company, which plans to apply for the necessary water rights. The projected dam would enable the Bonnington hydro-electric plant to give a twelve-month service. At the present time the winter output is about half of the maximum by reason of low flow.

Water District Names F. E. Weymouth Chief Engineer

Frank E. Weymouth, chief hydraulic engineer for the Los Angeles Department of Water and Power, has been named chief engineer for the Metropolitan Water District in charge of construction of the Colorado River Aqueduct. He will divide his time between the duties of the two offices.

Mr. Weymouth entered the employ of the City of Los Angeles in March of this year as assistant chief engineer of the Los Angeles Bureau of Water Works and Supply, resigning from the J. G. White Engineering Corporation for which he had had charge of a large irrigation contract being executed by that company for the Mexican government. A month later, on the reorganization of the Los Angeles Department of Water and Power, Mr. Weymouth became chief hydraulic engineer. Mr. Weymouth was connected with the United States Reclamation Service from its organization in 1902 until 1924, and during the last four years of that period, served as its chief engineer.

F. E. WEYMOUTH

The Metropolitan Water District, consisting of a number of communities in southern California, was formed for the purpose of bringing a domestic water supply from the Colorado River.

Coast Counties Company Acquires Small Utility—The Ben Lomond Light Company, Ben Lomond, Calif., has been authorized by the California Railroad Commission to transfer its system on or before Oct. 1, 1929, to the Coast Counties Gas & Electric Company for the sum of $50,000 in accordance with an agreement of May 1, 1929.

Electrical West Index—An index to Volume LXII of Electrical West, comprising the issues from January to June, 1929, inclusive, has been compiled and is ready for distribution. The index may be obtained by application to the publisher, the McGraw-Hill Company of California, at 883 Mission St., San Francisco.

June Bride Window Display Contest Winners Chosen

Winners this year in the June Bride window display contest conducted annually by the California Electrical Bureau, have been announced as follows:

First prize—$50. Central Electric Company, Watsonville.

Second prize—$25. H. L. Miller Company, Pasadena.

Third prize—$20. Kimball-Upson Company, Sacramento.

Fourth prize—$15. Sierra Madre Electric Company, Sierra Madre.

Fifth prize—$10. Newbery Electric Corporation, Los Angeles.

Sixth prize—$5. Electric Lighting Supply Company, Los Angeles.

Window displays were also entered in the contest by the following California dealers:

Benson Electric Company, Culver City.
Lynwood Electric Company, Lynwood.
H. W. Jacobs, Santa Rosa.
Guilbert Brothers, San Jose.
The Electric Shop, Lindsay.
John Breuner & Company, Oakland.
Torrance Electric Shop, Torrance.
L. Bowen, Torrance.
Newton Electric Corporation, Glendale.
J. A. Newton, Glendale.
Koch Hardware Company, San Francisco.
Mission Electric Company, Santa Barbara.
Earl Sanders Electric Store, Pasadena.
Just-Rite Electric Company, Watsonville.
Parmelee-Dohrmann Company, Long Beach.
G. E. Hensley, Long Beach.
Nygard Electric Company, Compton.
B. F. Barnett, Compton.

C. W. Davis, assistant display manager, O'Connor Moffatt & Company, San Francisco, and A. A. Nannizzi, display manager, City of Paris, San Francisco, acted as the judges of the contest. According to Victor W. Hartley, executive secretary of the California Electrical Bureau, the quality of the displays entered in the contest this year was of so high an average that the judges found the task of picking from the total entries the six best windows an exceedingly difficult one.

Photographs of the winning windows will be reproduced in a forthcoming issue of Electrical West.

Valuation Rehearing Sought By Power Companies

Both the Pacific Gas and Electric Company and the Great Western Power Company have applied to the California Railroad Commission for a rehearing of its recent decision fixing the prices to be paid by the City and County of San Francisco for the two companies' electric systems within the city, as they existed on Feb. 11, 1924. Both companies in their petitions attacked the valuations set by the commission on various items of their properties as unjust and unfair, particularly the allowance made for severance damages; challenged the jurisdiction of the commission to conduct such proceedings; questioned the legality of the Public Utilities Act giving the commission authority to make the valuations; and contended that the city followed an illegal procedure in coming before the commission.

The commission fixed the price of $26,685,000 to be paid to the Pacific Gas and Electric Company, with $3,050,000 allowed for severance damages. The valuation set for the Great Western Company's system was $11,815,000, with an allowance for severance damages of $3,375,000. The former company had evaluated its property at $60,000,000 and the latter at $30,000,000 with $27,000,000 and $15,000,000, respectively, claimed for severance damages. (Electrical West, July 1, 1929, p. 40.)

The City and County of San Francisco has filed protests with the railroad commission against the granting of the petitions for rehearing filed by the power companies.

FINANCIAL NEWS

Stone & Webster Form New $100,000,000 Corporation

Stone & Webster, Inc., which for 40 years has played a prominent part in the development of the public utility properties throughout the country, has announced the formation of a $100,000,000 corporation in which the public will have a 40 per cent participation.

The new organization will bear the name, Stone & Webster, Inc., but it is to be a Delaware corporation, whereas the former company was a Massachusetts corporation. Approximately $57,500,000 of new capital funds will be added to the enterprise, of which $40,000,000 will be derived from the sale of shares shortly to be offered to the public, and the balance will represent securities now held by Stone & Webster, Inc., which are to be turned over to the new organization. The business of the new company will continue under the same management.

P. G. & E. Co. Granted Time Extension on Stock Sale

An extension of time until July 1, 1930, has been granted by the California Railroad Commission to the Pacific Gas and Electric Company to issue and sell the unsold portion of an issue of 400,000 shares of 5½ per cent first preferred stock, of a total par value of $10,000,000. The company has advised the commission that 199,336 shares of this preferred stock, par value $4,983,400, is unsold, and that it will be unable to dispose of these shares at the price of $24.50 per share specified in the commission's previous order.

The company's request for authority to dispose of the unsold shares at not less than $24 per share was granted by the commission.

Power Company Granted Extension of Time to Sell Stock—An extension of time until June 30, 1930, has been granted by the California Railroad Commission to the San Joaquin Light & Power Corporation, Fresno, within which to issue and sell stock heretofore authorized by the commission.

May Report for Puget Sound Company Shows Substantial Gains—Substantial gains in gross and net earnings for May, with total gross of $1,299,108, an increase of $112,483 over May, 1928, have been reported by the Puget Sound Power & Light Company, Seattle. The balance for the month after deducting all expenses and charges was $647,983, or $101,418 more than the profits of the preceding May. Gross for the twelve months ended May 31 was $15,618,159, an advance of $686,708 over the preceding twelve months. Balance for the year was $4,028,932, an increase of $204,743. Prior earned surplus was $3,280,352, which brought the surplus to $7,309,284, and after deducting retirement reserve of $1,018,000, left $6,291,284. Dividends paid in the twelve months included $449,999 on the prior preference, $1,816,414 on the preferred, and $405,658 on the common.

Seattle City Council Authorizes $13,500,000 Bond Issue for Skagit Development—Under an ordinance passed by the Seattle City Council authorizing a bond issue of $13,500,000, all of the features of a five-year development program for the City Light Department on the Skagit River, inside the city, and at Cedar Falls on the Cedar River, now are provided for. The building of a new power house at Diablo, to cost about $2,500,000, is one of the important parts of the program covered by the bond issue.

Tacoma Light Department Shows Gain—The earnings of the City of Tacoma's Light Department for the month of May totaled $134,820.72, and netted the department $34,708.64, according to a report of the department filed with the City Council. The gross earnings of the light division to June 1 amounted to $1,038,895.47, of which $498,422.99 was net income.

City of Tacoma Sells First Block of Cushman No. 2 Bonds—Sale of the first block of $1,000,000 of the bonds of the issue of $3,850,000 authorized by the City of Tacoma for construction of the second unit of its Cushman power project has been made.

P. C. E. A.

3-Minute Speeches That Won at Convention

WINNERS in this year's three-minute speaking contest held during the P.C.E.A. convention at Del Monte, Calif., in June were James Barrington of the Coast Counties Gas & Electric Company, winner of first prize consisting of a share of stock to the value of $100 in any utility company, and Miss Helen McMillan of the Southern California Edison Company, winner of second prize, a trophy valued at $25. Text of the winning speeches follows:

"Use It Yourself"

By JAMES BARRINGTON

Coast Counties Gas & Electric Company.

In our business the main source of income lies in the sale of electrical energy. Our field would be extremely limited, however, if it were not for the myriads of home comfort appliances which require electricity for their operation.

Therefore, in order to establish and maintain a condition of healthy, vigorous economic growth, we must build up a constantly increasing demand for electrically operated appliances. To do this requires more than merely maintaining a sales force. It demands, among other things, a comprehensive program of educational publicity and a selling plan which allows every employee to co-operate in maintaining direct contact with the customer.

Although the part assigned you will vary with local conditions, it is absolutely essential in all cases that you have an intimate, first-hand knowledge of the operation, maintenance and economic value of the appliances handled by your organization. Each one is a labor- and time-saving device. Combined, they offer you and your home folks more leisure, greater ease, and a fuller measure of happiness.

Further consideration of this question involves your duty to the public. The people of your community look to you for authentic information on costs, correct methods of installation and operation, number and location of convenience outlets, and all the thousand and one problems which arise concerning electrical service. A great corporation tells you, "Ask the man who owns one." They well know that personal ownership offers the most direct means by which definite and precise information may be obtained. This is particularly true in the electrical industry. Your own home is the place in which to acquire an accurate knowledge of facts; consider it a laboratory in which each appliance may be tested and the facts determined. Give your customer the benefit of what you learn. Let him form the habit of coming to you for information and advice about electrical equipment. He will have faith in what you say if he knows your knowledge is born of experience. Personal comfort is the loadstone which draws his interest and holds his attention.

Your success as an employee depends upon the success achieved by your company. Make your company's business your business. Know every appliance it sells; use it yourself and the added confidence which pride of ownership gives you will enable you to convince others that electrical servants are not luxuries, but necessities.

"Use It Yourself"

By Helen McMILLAN

Southern California Eudson Company.

To "Use It Yourself" is to know it. We, the employees of public utility companies, must know the value and advantages of our product, electricity, in order that we may point out its fine qualities to our customers, who, in the final analysis, are the users of all those electricity-consuming devices from which our companies derive their revenue. Good salesmanship depends largely upon the knowledge one has of the merchandise he represents, and he can learn its true value and importance only by using it himself.

The first fuel used by man was wood; then wood gradually was replaced by coal until gas became the principal fuel. However, today we find that electricity not only replaces all these fuels, but it also is mankind's most versatile servant.

There are innumerable ways of commanding electricity so that it will work for

The winners—Miss Helen McMillan and James Barrington.

you, the best of which are found by experiment or the use of it yourself. However much one may know about the vacuum cleaner, the washer, the ironer, the range and the refrigerator, he cannot appreciate their full value until he experiences their use in his own home.

We all have a fairly good idea as to what electricity is and we have a mild appreciation of its value, but we must use it ourselves in order that we may convince our customers of its importance in this modern age. True appreciation of electricity comes only with the acquaintance of its many applications and the personal knowledge of its cleanliness, convenience and economy. And we owe, not only to ourselves, but to our companies, the acquaintance which comes with the use of it. Then if we use it ourselves, we may explain to our customers more easily and more convincingly how it lightens the tasks of the housewife and the labor of man through a larger use of machinery. We may also point out its qualities, not only from a salesman's viewpoint, but from the user's viewpoint as well. And in doing so, we know that we are rendering our customer a greater service by explaining to him how he, too, may know the true value and importance contained in the three small but significant words, "Use It Yourself."

El Paso Women's Committee Elects Officers—At a recent meeting of the women's committee of the El Paso Electric Company, El Paso, Texas, the following officers were chosen for the ensuing year: chairman—Miss Anna Mae Tillman; vice-chairman—Mrs. Patricia McKee; secretary—Miss Lillian Bell; and treasurer—Miss Irene Stewart.

Engineering Section Meeting Dates Set—A meeting of the Engineering Section will be held in San Francisco Sept. 18-20. The winter conclave of this section will be held in January in Los Angeles.

Advertising-Publicity Section Chairman Resigns—Continued ill health has resulted in the resignation of F. Z. Stone, The Southern Sierras Power Company, as chairman of the Advertising-Publicity Section for the year 1929-30. E. B. Criddle, president of the P.C.E.A., has appointed George C. Tenney, Electrical West, who was vice-chairman of the section, to the position of chairman. A new vice-chairman has not yet been selected.

A. I. E. E.

Program of Santa Monica Convention Announced

PLANS for the Pacific Coast convention of the American Institute of Electrical Engineers to be held in Santa Monica, Calif., Sept. 3-6, as revealed by an outline of the program, promise delegates and guests a most profitable and enjoyable meeting. This outline follows:

Sept. 3—Tuesday Morning

Section Papers:

"Radio Interference From Line Insulators," Van Atta and White.
"Spray and Fog Tests on 220-Kv. Insulators," R. J. C. Wood.
"Sixty-Cycle Flashover of Long Insulator Strings," Carrol and Angus.
"Impulse Insulation Characteristics of Wood Pole Lines," H. L. Melvin.

Tuesday Afternoon

Student Papers:

"Experience With a Cathode Ray Oscillograph in a College Laboratory," Charles C. Lash, graduate student, California Institute of Technology.
"Lichtenberg Figures," Orland C. Mayer, University of Idaho.
"Characteristics of Electrostatic Loud Speakers," F. J. Somers and George Mattos, University of Santa Clara.
"Flashover Phenomena in High Voltage Engineering," W. G. Hoover, and Corbett, graduate students, Stanford University.
"Voltage Distribution on High Tension Insulators," Floyd Gowans and Ned Chapman, University of Utah.
"Voltage Amplification of the Screen Grid Tube as an Intermediate Frequency Amplifier," Frank Giovanini, graduate student, University of Washington.

Sept. 4—Wednesday Morning and Afternoon

Inspection trips and sports.

Wednesday Evening

Lecture—"Recent Developments in the Electrical Conductivity of Metals," W. V. Houston.

Sept. 5—Thursday Morning

Student Papers:

"Influence of Rotor Impedance on the Starting Characteristics of Squirrel Cage Induction Motors," Andrew V. Haeff, graduate student, California Institute of Technology.
"The Heating of Copper Conductors by Transient Electric Currents," S. O. Rice, Oregon State College.
"Cyclic and Transient Illumination of Incandescent Lamps as Measured by the Photoelectric Cell," Zed J. Atlee and Ralph W. Mige, Oregon State College.
"Study of the Losses in a 25,000-kva. a.c. Generator," J. G. Pleasants and M. Tucker, University of Southern California.
"The Operation of Synchronous Motors in Series," Carl R. Koch, graduate student, Stanford University.
"Power Losses by Radiation From Domestic Hot Water Tanks," R. D. Wailes, University of Washington.

Thursday Afternoon

Section Papers:

"Development of Insulating Oils," C. E. Skinner.
"Effect of Tank Color on Temperature of Transformers Under Service Conditions," Wetherill and Montsinger.
"Population Studies as an Index to Electrical Development," N. B. Hinson.
"Flames From Electric Arcs," Slepian.
"Design Features That Make Large Turbo-Generators Possible," W. J. Foster.

Sept. 6—Friday Morning

"The Effect of Surges on Transformer Windings," Hodnette.
"An Underground a.c. Network System Without Network Protectors," Gamble.
"Development of Low-Current—High-Voltage Fuses," Roy Wilkins.
"Neon Filled Tubes and Their Characteristics," Crane and Slocum.
"Electrical Control Features of Wind Tunnel at California Institute of Technology," Lewis.

Friday Afternoon

"Sound Pictures," Shay and Morgan.
"Dial Telephone System Serving Small Communities in Southern California," F. O. Wheelock.
"Parallel Operation of Transformers Whose Ratios of Transformation Are Unequal," Mable Macferran.
"Relation of System Connections and Apparatus to Stability, General Electric Company.
"Synchronous Generation of Voltage Consumed by Line Inductance," Morgan.

ENTERTAINMENT

Tuesday Evening

President's reception, followed by dancing.

Wednesday Morning and Afternoon

Inspection trips and sports.

Special Trips: To the Long Beach No. 3 steam plant of the Southern California Edison Company and to its Lighthipe 220-kv. substation; to the Seal Beach steam plant of the Los Angeles Gas and Electric Corporation; and to the Central and Wilmington receiving stations of the Los Angeles Bureau of Water and Power.

To the City of Los Angeles Aqueduct hydroelectric plants, which will include a stop at the San Fernando Mission and a visit to the Pacoima flood control dam of Los Angeles County.

To The Southern Sierras Power Company's substation in San Bernardino, including a visit to the Mission Inn, Riverside, and an inspection of the Hotpoint factory at Ontario.

To the Million-Volt Laboratory of the California Institute of Technology, Pasadena, with a stop at the University of California, Southern Branch, Los Angeles.

Golf: The golf tournament will be played at the Brentwood Country Club.

Suitable arrangements also have been made whereby guests may receive cards to practically all the leading clubs, such as the Los Angeles Country Club, Brentwood, Rancho, Bel-Air and Riviera.

Wednesday Evening

10 to 12 p.m., dancing.

Thursday Evening

Banquet with special entertainment features.

Special Trips: In addition to the trips listed, arrangements may be made for a one or two-day trip to Catalina Island, an all-day trip to Mount Lowe, and a two-day trip on Saturday and Sunday, following the convention, to San Diego with visits to Tiajuana and Agua Caliente.

LADIES' ENTERTAINMENT

Tuesday

No formal entertainment but sufficient automobiles available for the various members of the ladies' entertainment committee, who may act as guides on visits to interesting points in and around Los Angeles.

Wednesday Noon

Ladies' luncheon to honor Mrs. E. R. Northmore, wife of the regional vice-president, with Mrs. H. L. Caldwell presiding.

Wednesday afternoon will be devoted to an informal reception for Mrs. Northmore with tea and cards, either at the Miramar Beach Club or at the hotel.

Thursday Morning

Ladies' putting contest.

Complete details for the ladies' entertainment have not been arranged but in addition to those mentioned, studio trips will be arranged and the ladies will have the use of the Miramar Beach Club at all times.

Reservations for hotel accommodations should be made direct with the Miramar Hotel, Santa Monica, Calif., Morgan S. Tyler, resident manager. Hotel rates are as follows: For rooms in the main building and the cottages —$3.50 per person per day. This rate is on the basis of double rooms with bath. Rooms are extra large. Double suites in the annex will accommodate three or four, and single suites will accommodate two people, each suite with bath. The rates in the annex are $3 per person per day.

The regular club privileges of the Miramar Beach Club will be extended to all guests at the convention, the only charge being for the rental of bathing suit and locker for use in surf bathing or in the heated salt water pool. The regular charge for this is 75 cents per person, but for the convention delegates the rate will be 50 cents per person.

Rates for meals follow: Club breakfast, 25 cents to $1; luncheon $1; dinner, $1.50; a la carte service also at all meals.

Year's Officers Elected at Annual Convention

At the annual convention of the American Institute of Electrical Engineers held recently in Swampscott, Mass., Harold B. Smith, professor of electrical engineering, Worcester Polytechnic Institute, Worcester, Mass., and consulting engineer, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., was elected president of the Institute. Western regional vice-presidents elected were Herbert S. Evans, Dean of the College of Engineering, and professor of electrical engineering at the University of Colorado, Boulder, and C. E. Fleager, vice-president, Pacific Telephone and Telegraph Company, San Francisco. G. E. Quinan, chief electrical engineer, Puget Sound Power & Light Company, Seattle, continues as a member of the board of directors. The administration year begins Aug. 1.

At a meeting of the board of directors held during the convention, the following American engineers were elected honorary members of the Institute: Herbert Hoover, most outstanding American engineer; Charles F. Scott, engineer and inventor, head of the electrical engineering department of Yale University, past president of the Institute; and Charles F. Brush, of Cleveland, Ohio, engineer and scientist, whose death occurred on June 15 at the time he was being balloted upon. The directors voted unanimously to include Dr. Brush's name in the list of honorary members.

Meetings

San Diego Engineers' Club Has 85 Charter Members

Organization of the Engineers' Club of San Diebo with a charter membership of 85 has been announced. The club will be the voice of the engineering profession in San Diego, will be representative of all branches of engineering and will take an active part in civic affairs, according to the announcement. The club, which is only a local organization and not affiliated with any state or national group, will hold monthly meetings.

Officers elected for the ensuing year are: president—E. L. Freeland; vice-president—R. R. Roe; secretary—R. E. Jensen; and treasurer—E. H. Smith.

Power Engineers of Salt Lake Elect Officers—At a recent election of the Salt Lake chapter of the National Association of Power Engineers, the following officers were chosen for the ensuing administration: president—W. D. Hawkes; vice-president—Edgar F. Bailey; recording secretary—John T. Caley; corresponding secretary—C. E. Chapman; financial secretary—J. P. Quigley; treasurer—J. S. Durrant. G. W. Nourse, retiring president, was named trustee. Mr. Hawkes and Mr. Quigley were chosen delegates to the national convention in Nashville, Tenn.

Coming Events

American Institute of Electrical Engineers—Annual Pacific Coast convention in Santa Monica, Sept. 3-6, 1929.

Association of Electragists, International—Annual convention in Swampscott, Mass., Sept. 30-Oct. 4, 1929.

Illuminating Engineering Society—Annual convention at Bellevue-Stratford Hotel, Philadelphia, Sept. 24-27, 1929.

International Association of Electrical Inspectors, Northwest Section (formerly Northwest Association of Electrical Inspectors)—Annual convention in Vancouver, B. C., Sept. 9-11, 1929.

Pacific Coast Electrical Association—Engineering Section meeting in San Francisco, Sept. 18-20, 1929.

Southwestern Section (formerly California Association of Electrical Inspectors)—Annual convention in Sacramento, Calif., Sept. 18-20, 1929.

Radio Trade Show—In Civic Auditorium, San Francisco, Aug. 17-24, 1929.

Rocky Mountain Division, N.E.L.A.-Colorado Utilities Association—Joint meeting in Glenwood Springs, Colo., Sept. 9-11, 1929.

World Engineering Congress—Tokio, Japan, beginning Oct. 30, 1929.

Seattle Club Holds Successful Golf Tournament—The sixth annual golf tournament of the Seattle Electric Club, Seattle, held recently at the Earlington Golf Club, was declared the most successful yet held by the club. Reno Thatcher, of the Puget Sound Power & Light Company, was general chairman of the program committee, aided by Walter Funfsinn, Grover Burke and R. W. Clark. J. Edwin Roberts, representing the Arrow Electric Company in the Seattle district, won the Harry J. Martin trophy, after a play-off with J. R. Wells of the Fobes Supply Company.

Employees' Association Installs Officers—At its annual installation meeting held July 9 in Los Angeles, the Los Angeles Gas and Electric Corporation Employees' Association elected the following officers for the year 1929-30: president—W. H. Ulm; vice-president—O. R. Marvel; treasurer—Arthur Maltitz; directors-at-large—J. L. LaSpada and E. P. Ramsay; directors—C. E. Bates, Marvel Murray, J. J. McCrory, W. T. Rush, P. A. Chailie, C. H. Zeise and Elmer George.

Personals

Man of Wide Experience Is New President of P.C.E.A.

THE newly elected president of the Pacific Coast Electric Association, E. B. Criddle, has been an active worker in the association for many years, the greater part of his energies having been devoted to the activities of the Public Relations Section. He served as first vice-president of the association last year.

Mr. Criddle is vice-president of The Southern Sierras Power Company and of its affiliate, The Nevada-California

E. B. CRIDDLE

Power Company, Riverside, Calif. He has been connected with the Southern Sierras company for eighteen years, having joined the organization in 1911 as district manager for the northern division. Two years later he was made general agent with headquarters in Riverside, a position which he held until 1923 when he was named vice-president.

Prior to his entry into the electrical field, Mr. Criddle's experience covered a wide range of industries which formed a good foundation for his electrical work. This experience included drafting, railroad clerical work, rate making and shop work, public accountancy and real estate. He was at one time manager of an ice plant; at another period of his career he was manager of a rolling mill, and still later served as superintendent of a gold reduction works.

K. M. Robinson, formerly division manager, Idaho Power Company, Payette, Idaho, has been promoted to the general office at Boise to handle special assignments under the general manager. Succeeding Mr. Robinson at Payette is **J. C. Baldridge,** formerly supertendent of rural service, who is in turn succeeded by **Robert Overstreet,** who also will continue as the company's agricultural engineer.

Ella M. Lehr, who has directed the home service work of the Pacific Gas and Electric Company, San Francisco, for the past several years, has organized the Ella Lehr Cooking Schools, with offices in the Monadnock Building, San Francisco. Miss Lehr's organization will operate with newspapers throughout the Pacific Coast in promotion work for home equipment and food products.

H. S. Perkins, formerly identified for twenty years with electric transmission line and central station development on the Pacific Coast, has been appointed general sales manager of the Cook Porcelain Insulator Corporation, Cambridge, Ohio.

F. J. Airey New President of L. A. Electric Club

FRANK J. AIREY, manager of the Pacific States Electric Company, southern California branch, has been elected president of the Los Angeles Electric Club for the ensuing year. Mr. Airey was one of the organizers of the Los Angeles Electric Club and was its first secretary. For the past year he has been a vice-president of the organization.

Mr. Airey was born in Buffalo, New York, in 1876. Through force of circumstances it became necessary for him to leave school at the age of 11, when he began as an office boy for the

FRANK J. AIREY

American Electrical Supply Company of Buffalo, which later was consolidated with the F. P. Little Electrical Company of that city. He was employed continuously with these two concerns up to October, 1910, and when he left Buffalo because of illness in his family he was president of the company.

He arrived in Los Angeles late in October, 1910, and went to work immediately with the Pacific States Electric Company, with which company he has been connected ever since. His first position with the company was as city salesman, later as sales manager, and for the past twelve years or more in the position of manager he has been in charge of the company's operations in southern California and Arizona.

Successor to F. E. Bonner In Forest Service Appointed

EDWIN W. KRAMER, hydro-electric engineer of the California district of the U. S. Forest Service, has been made district engineer, succeeding Frank E. Bonner, whose appointment as secretary of the Federal Power Commission at Washington, D. C., was recently announced.

Mr. Kramer, who received his civil engineering degree from Cornell University, has been an officer of the Forest Service for 22 years. He has had extensive experience in engineering work in the East under the War Department and on water power projects in Montana, Idaho, Washington, Oregon and California. For four years he was district engineer of the North Pacific District of the Forest Service with headquarters at Missoula, Mont., and

EDWIN W. KRAMER

he also served as representative of the Department of Agriculture on an interdepartmental board appointed to investigate certain water power projects in California in which irrigation played an important part. In his new position Mr. Kramer becomes the representative of the Federal Power Commission in the California district.

E. E. Manning, formerly division manager for the Southern California Telephone & Telegraph Company, has succeeded to the position left vacant by the promotion of Mr. Wise, and **M. L. Stannard,** formerly general commercial engineer for the same company, has succeeded Mr. Manning as division manager.

E. D. Wise, formerly assistant to the general manager, Southern California Telephone Company, Los Angeles, on July 1 became general plant manager of the Pacific Telephone and Telegraph Company, central area, with headquarters in San Francisco.

Harry L. Harper, manager in Los Angeles for the Graybar Electric Company, recently was honored by employees of that organization upon the occasion of completion of 25 years of service with the company.

Glenn L. Jackson, for the past two years sales manager for the Mountain States Power Company, has been made sales manager for that company and The California Oregon Power Company. **J. J. Buchter** and **H. L. Bromley**, merchandise manager and advertising manager, respectively, for The California Oregon Power Company, now hold those positions with both companies.

B. W. Kerr, president, Railway & Industrial Engineering Company, Greensburg, Pa., spent some time on the Pacific Coast recently in the interests of his company. At conferences held by him with engineers in the larger cities motion pictures of equipment manufactured by the Railway & Industrial Engineering Company, both in operation and on test in the course of manufacture, were shown.

Martin P. Rice, manager of the publicity department, General Electric Company, Schenectady, N. Y., accompanied by **Mrs. Rice**, and **H. Sadenwater**, supervisor of technical broadcasting operations for the company, recently spent some time in the far West in an annual inspection of the company's broacasting stations.

Yasuzaemon Matsunaga, known as the "power king of Japan," recently sailed from Vancouver, B. C., en route to Japan, after a two months' tour of the United States, Canada and Europe in the interests of the Toho Electric Power Company, Ltd., of which he is president.

Ralph E. Jump has been made assistant to **James E. Jordan**, superintendent of distribution for the El Paso Electric Company, El Paso, Texas. In addition to his new duties Mr. Jump has direct supervision over the dispatch division and also will continue his work as safety engineer.

Joseph Thompson, president, Pacific Electric Manufacturing Company, San Francisco, was one of a delegation consisting of representatives of various types of business, which left New York July 3 to make a tour of Russia under the auspices of the Russian-American Chamber of Commerce. The party expects to return the latter part of August.

E. O. Howard, president, Utah Light & Traction Company, Salt Lake City, was elected president of the local Chamber of Commerce at a meeting of the board of governors held June 17. Mr. Howard is serving his third year as a member of the board.

I. B. Walther, formerly purchasing agent for The California Oregon Power Company, Medford, Ore., has accepted a position with the American & Foreign Power Corporation, with headquarters in Rio de Janeiro.

L. S. Cheetham has been appointed manager of the University store of the Puget Sound Power & Light Company, Seattle, to succeed H. Gardner, who has been transferred to the company's main office.

Art Church, since 1920 district manager at Santa Maria, Calif., for the San Joaquin Light & Power Corporation, has been made sales engineer, succeeding **T. K. Holmes**, who has resigned to become sales manager of the Yosemite Portland Cement Company. Mr. Church will specialize in oil field installations and will divide his time between Fresno, the oil fields in the San Joaquin territory, and Los Angeles. He will be replaced in Santa Maria by **G. V. Footman**, formerly district manager at Coalinga. **J. C. Berry**, since 1925 assistant district manager, has been promoted to district manager.

Obituary

Death Takes Former Edison Company Official

SAMUEL M. KENNEDY, retired vice-president of the Southern California Edison Company, died July 18 at his home in Alhambra, Calif.

Mr. Kennedy had been connected with the Southern California Edison Company for more than twenty years, having entered the organization in 1903 when the United Electric, Gas & Power Company was absorbed by the Edison company. At the time of his retirement early in 1927 he was vice-president in charge of business development and public relations. In public relations work Mr. Kennedy was a recognized leader on the Pacific Coast, and his writings on this subject have been widely circulated, his essay, "The Man on the Street," and his book, "Winning the Public," being among the best known. Much of his success in public relations work was attributed to the fact that he always advocated and practiced courtesy and consideration in his dealings with the public, combined with intelligent effort to deal fairly and unstandingly with the individuals that go to make up that public.

SAMUEL M. KENNEDY

W. A. Baurhyte, Retired Utility Leader, Passes

WILLIAM A. BAURHYTE, formerly president of the Los Angeles Gas and Electric Corporation and president of the Pacific Coast Electrical Association during the 1925-26 administration, died in Los Angeles July 4.

Mr. Baurhyte had resigned as executive of the Los Angeles Gas and Electric Corporation on March 31, 1928, to take an extended vacation from business duties. His service with the company dated from Sept. 1, 1903, when he left the Pacific Gas & Development Company to become second vice-president of the power company. Ten years later he was elected vice-president, and in 1921, on account of his special experience, he was made vice-president and general manager. He became president in 1924.

WILLIAM A. BAURHYTE

Kindly, sympathetic, interested in his fellow men, Mr. Baurhyte knew by his first name almost every employee of the company which he served for 25 years, and his door was never closed to any who might wish to seek his counsel. Aside from his regular duties, he found time to take an active part in civic affairs, and his passing is a great loss not only to his family, friends and associates, but also to the community.

Sylvester M. Karicofe, founder of the Quality Electric Works, the first electric motor works in the Southwest, died in Sierra Madre, Calif., July 8. He served as president of the Quality Electric Works until the last few years when failing health caused him to retire.

Louis E. Bean, chairman of the Oregon Public Service Commission, died in Salem, Ore., July 6, following a heart attack. For nearly three years Mr. Bean had served as a member of the commission and during the last two years had been its chairman.

Wheeler G. Jensen, a salesman with the Pacific States Electric Company in the Santa Cruz, Calif., territory, was killed by a fall while on a fishing trip recently near Ukiah, Calif.

Contractors, Dealers and Inspectors

Davis Urges Concentration on Credit Plan by Contractors

LAURENCE W. DAVIS, manager of the Association of Electragists, International, at a meeting in Spokane, Wash., Saturday, July 13, completed a brief visit to the Pacific Coast on behalf of the A. E. I. He spoke to meetings of contractors and jobbers held especially for him at Spokane, Seattle, Portland, San Francisco, Santa Barbara, Los Angeles and San Diego.

The growing importance of strict regulation of credit by means of some plan similar to that operated in Detroit, known as "the Biddle Credit Plan" (see Electrical West, Dec. 1, 1928, p. 338), was particularly emphasized by Mr. Davis in every city in which he spoke. As a thoroughly sound and economic method of regulating the contracting business Mr. Davis held that it could be put into effect in any city in which the contractors made it known definitely to their jobbers that they wanted such a plan and would support as a matter of good business policy those jobbing establishments which made a policy of such rigid credit terms.

Mr. Davis, in each case, began by showing the tendencies toward consolidation and merger in all lines of business and pointed out that the most logical form of merger for such individualistic enterprises as contracting establishments was by means of the trade association chapter. He went on to show how this particular trade association, the A.E.I., was organized to handle from headquarters a great number of problems vitally affecting every contractor's business. By way of illustration he enumerated and explained a number of the immediate problems before the association which he had brought with him to discuss with Cylde Chamblin, president of the association, at San Francisco.

The chapter organization of Electragist groups in all parts of the country, was next described by Mr. Davis. The value of a large number of well organized small groups of contractor-dealers for study and action upon matters of national policy, he said, was very important. Thus organized the association would be more respected and honored than before, when the organization was made up of scattered members not necessarily locally organized.

The most serious local problem facing contractors, that of credit extension, can be handled only by sincere and determined local chapters, he stated. He then proceeded to explain and describe the beneficial results which have accrued from the Detroit credit plan wherever it has been tried. He named a number of cities in the East where the plan has been started and is going successfully.

So convincing was the evidence which Mr. Davis presented that in every city in which he spoke, and many others where he only had time for a brief visit, committees were formed to take up for study jointly with the jobbing organizations of their communities the possibility of inaugurating such a plan locally.

In southern California the meetings were arranged for by Frank Connolly, field secretary of the California Electragists, Southern Division, now to be known as the southern chapter. In San Diego he was aided by O. W. Karl, secretary of the local contractors' association. In Los Angeles Frank McGinley, vice-president of the state association, presided.

In San Francisco Eddie Martin, president of the state association, had charge of the arrangements. The meeting was held jointly with the contractors' association.

In Portland J. R. Tomlinson, field secretary for the Oregon Electragists, made the arrangements for the meeting, which was called by the Portland Electric Club and presided over by F. H. Murphy, president of the club.

In Seattle J. J. Agutter, of the Seattle contractors association, had charge of the meeting arrangements. In Spokane Charles Duncan was in charge of the meeting.

Mr. Davis also urged that as many men as possible be delegated to attend the national convention at Swampscott, Mass., in September. A number of prominent leaders in the electrical contracting branch of the industry have agreed to go to represent Western chapters.

Oregon Electragists Discuss Problems and Hear Industry Views

SELLING of lighting, jobber and central station relations with contractor-dealers, and accounting, were the subjects discussed at a meeting of the Oregon Electragists at Eugene, Ore., June 17-18, 1929, while golf was the principal diversion. Speakers on these subjects were heard at the open session on the afternoon of June 17 and at the banquet that night, the morning session being a closed meeting for the contractors.

The annual golf tournament between the representatives of the supply houses and the contractors for the Electragist trophy was played at the Eugene Country Club, June 18. This trophy, first placed in competition last year when it was won by the Electragists, this year was carried off by the jobbers' and manufacturers' representatives by a score of 18½ to 8½. The sessions were attended by about 45, and were presided over by Frank L. Robinson, La Grande, Ore., president of the association.

The subject of selling lighting was opened at the afternoon session by Fred Zaugg, illuminating engineer, Northwestern Electric Company, Portland, who, with the aid of charts explained some of the fundamental phenomena of the act of seeing and drew out the significance of these phenomena in planning a lighting job and selling illumination adequate to the purpose for which it is intended.

This was followed by a discussion of the Franklin specifications for commercial and industrial lighting presented by Jay S. Groo, manager lighting division, Portland Electric Power Company, Portland. These specifications give foot-candle intensities desirable for minimum, medium and good lighting jobs for a wide range of industrial processes and commercial uses, and contain charts from which with various known factors as to size of rooms, kinds of walls and ceilings and other influences, the kind of unit, size, hanging height and spacing to deliver the desired intensity can be figured. Several examples of working out a satisfactory lighting installation from the charts were given.

Mr. Groo led up to his explanation of the Franklin specifications by outlining the volume of wiring in the Portland territory in recent years, showing that the high point was reached in 1926 following closely the curve of building permits. He urged that contractors attempt to sell more wiring to each job, and showed the result of Red Seal campaigns in California as revealed in the report of this activity published in Electrical West, Oct. 1, 1928.

Jobber Speaks

Representing the jobbers, Harry Brown, manager of the Electric Corporation, Portland, commended the Electragist movement, bringing out the possibilities for betterment of conditions through adoption of the policies embodied in it; advocated making eligibility rules more flexible to permit the inclusion of small operators; defended jobbers' policies of handling quality merchandise, suggested an improvement of credit policies by the use of the "Biddle Plan," or a similar one; urged contractors to acquire the point of view of "big business"; outlined some trends in the radio industry as indicated at the recent Radio Manufacturers Association show at Chicago, and closed with an

optimistic forecast of the improvement of general business conditions in the Northwest.

Closing the afternoon session, M. A. Preisz, association accountant, indicated the trend of the contracting business this year by revealing a consolidation of results of six firms' operations for the first five months of 1929. These firms had, since Jan. 1, done a gross business of $96,000, costs and profit being distributed as follows: Material, 49.6 per cent; labor, 24 per cent; direct to job charges, including commissions, 1.5 per cent; overhead, including salaries of owners or proprietors, 21.6 per cent; net operating profit, 3.3 per cent. This profit had been increased slightly by other income from interest received and discounts taken. He stated that the weakest spot in the business was in accounts receivable, the bulk of which instead of being collected in 60 days ran to 120 days.

Explains Merchandise Plans

The feature of the banquet Monday night was a talk by Lewis A. McArthur, vice-president and general manager, Pacific Power & Light Company, Portland, whose company sold $790,000 worth of electrical merchandise in 1928, representing a little over $17 per residential customer. Mr. McArthur explained the reasons for his company's merchandising operations, bringing out the central station's point of view with respect to load-building policies. He described methods by which the merchandising department of his company offered dealer co-operation during campaigns or "specials" conducted by the company.

Berkeley Snow, Northwest editor, Electrical West, outlined the history and background of Light's Golden Jubilee, celebrating the 50th anniversary of the invention by Thomas A. Edison of the incandescent lamp, which is to culminate Oct. 21, 1929, bringing out the significance to the electrical industry and to the world at large of this event. Roy C. Kenney, manager, NePage-McKenny Company, Portland, outlined some of the troubles of the contracting business and suggested remedies. E. O. Immel, Eugene attorney, acted as toastmaster.

At the closed session for contractor-dealers, John R. Tomlinson, Tomlinson Electric Company, Portland, secretary of the Oregon Electragists, reported on the field work that had been done since the last meeting, which had been made possible by supporting memberships carried by power companies and jobbers. He explained a plan for exchanging credit information among contractors in Portland, and outlined a method for setting up similar machinery in other localities.

J. R. Tomlinson, secretary of the Oregon Electragists' organization, was recently appointed field man for the same organization. Mr. Tomlinson was instrumental in getting together the state organization under the Electragists' banner.

Denver Contractors Get A.E.I. Charter

The Denver Electrical Contractors Association, Inc., has received its charter as Denver Chapter of the Association of Electragists, International. This affiliation with the Electragists' body requires 100 per cent membership in the international association.

At the annual meeting of the Denver Electrical Contractors Association the following officers were elected: president—L. A. Vosmer; vice-president—C. W. Nelson; secretary-treasurer—E. C. Headrick. The board of directors consists of these officers and C. N. Shannon and D. D. Sturgeon.

Everywhere He Goes

K. D. Miller, Electragist at Whittier, Calif., believes in advertising as he goes. The tire cover on his car advertises electric ranges, water and room heaters, the Red Seal home and Westinghouse wiring materials.

O. W. Karl, of San Diego, has a unique electrical-contractor establishment in that Mrs. Karl conducts a flower shop in connection with the electric store. Flowers are Mrs. Karl's hobby and in taking care of the store during the day she makes a profitable business of her own out of the flower shop. She finds that flowers are related to home furnishings and often makes sales of electrical appliances, fixtures or lamps to people whose interest primarily is in flowers.

R. B. Hess, electrical contractor-dealer of San Rafael, Calif., has recently remodeled his store. His new store front with windows adequately lighted gives him better display facilities. He was also instrumental in having revamped the fronts of several stores in the same block.

The Weddell Electric Company, San Francisco, of which Dick Ouer is proprietor, has recently moved from 340 Sansome St. to a new location at 426 Kearney St.

Committees Named for Inspectors Group

Carl W. Beaton, president of the Southwestern Section, International Association of Electrical Inspectors, in a recent personal letter to all members urging preparation for the forthcoming convention of that group to be held at Sacramento, "the Garden of Eden," announced that the following committees would report at that time:

SOUTHWESTERN SECTION

International Association of Electrical Inspectors Committees for 1928-1929

1. **Articles of Association**—R. H. Manahan, Los Angeles, chairman; Jas. M. Evans, Los Angeles.
2. **Clearing House**—Ben. C. Hill, Oakland.
3. **Demand Factor**—Jas. M. Evans, Los Angeles, chairman; E. J. Crawford, Fresno; R. J. Larrabee and J. W. Wrenn, San Francisco.
4. **Ordinances**—Jas. M. Evans, Los Angeles; chairman; O. Barnwell, Beverly Hills; James McConahey, Los Angeles.
5. **State Safety Orders**—R. W. Wiley, San Francisco, chairman; C. E. Hardy, Oakland; R. H. Manahan and Herbert G. Ufer, Los Angeles.
6. **N. E. Code Articles 1, 2 and 3**—W. E. Brothers, Berkeley, chairman; K. J. Bickel, Martinez; C. Drathman, Redwood City; M. L. Hutchinson, Monrovia.
7. **N. E. Code Articles 4 and 8**—F. A. Short, Los Angeles, chairman; R. M. Coon, San Francisco; C. E. Hardy, Oakland; Jas. M. Evans and R. H. Manahan, Los Angeles; A. C. Veit, Alhambra.
8. **N. E. Code Articles 5, 6 and 7**—R. H. Manahan, Los Angeles, chairman; J. H. Crannell, Glendale; Frank R. Ellison, Oakland; C. B. Pickett, Coronado; Fred Vore, Pasadena.
9. **N. E. Code Articles 9 and 10**—H. N. Beecher, Los Angeles, chairman; Jas. M. Evans, Los Angeles; W. O. Packard, Santa Ana; C. V. F. Taylor, Claremont.
10. **N. E. Code Articles 10, 30, 31 and 50**—C. E. Hardy, Oakland, chairman; G. E. Kimball, San Francisco.
11. **N. E. Code Articles 11, 16, 17 and 32**—C. R. Meikel, Bakersfield, chairman; A. E. Gilkey, Roseville; Walter Stracke, Santa Rosa.
12. **N. E. Code Articles 12 and 13**—Jas. I. Dixon, Santa Clara, chairman; S. F. Butler, Salinas; F. W. C. Butow, San Bruno; Edw. M. McLaughlin, Richmond; H. C. Noble, Los Gatos; E. H. Snedaker, San Jose.
13. **N. E. Code Articles 14, 15 and 38**—C. T. Coyle, Fresno, chairman; F. C. Colville, San Leandro; E. C. Gerry, Monterey; C. L. Heney, Eureka; F. A. Morrell, Stockton; H. C. Weisenburger, Watsonville.
14. **N. E. Code Articles 18, 33 and 40**—A. E. Johnstone, San Diego, chairman; D. H. Alexander, Long Beach; R. H. McKibbin, El Centro; J. W. Munn, Glendale; Jas. T. Ricker, San Bernardino; Wm. P. Jensen, Oceanside.
15. **N. E. Code Articles 34, 35, 36 and 39**—Jas. M. Evans, Los Angeles, chairman; Jas. McConahey, Los Angeles; Albon Bevis, Ontario; L. W. DeYoung, Inglewood.
16. **N. E. Code Articles 37 and 60**—R. W. Wiley, San Francisco, chairman; O. W. Tait, Mountain View; A. V. Youens, Palo Alto.

The Allied Trade and Radio Dealers Association has been organized in San Diego recently with **A. C. Miller** as president and **Charles Williams** as secretary, both of 1140 Fourth St. A new radio interference ordinance has recently been passed under the sponsorship of this association in San Diego.

E. F. Fischer opened up a store in Nevada City recently to handle a complete line of electrical appliances, radio and sporting goods in connection with contracting and wiring. The business is called **Fischer's Electric Shop.**

Manufacturer & Distributor

F. A. Merrick New President of Westinghouse

Following the recent resignation of E. M. Herr, president since 1911 of the Westinghouse Electric & Manufacturing Company, F. A. Merrick, formerly vice-president and general manager of the Westinghouse company, was elected

F. A. MERRICK

president. While accepting the resignation of Mr. Herr in order that he might go on an extended vacation, the board of directors appointed him vice-chairman.

Mr. Merrick is a native of New Jersey and received his technical education at Lehigh University. Shortly after graduation he was employed by the Steel Motors Company, a subsidiary of the Lorain Steel Company, where he was responsible for many important electrical inventions and where he rose to the position of manager and chief engineer.

Upon the acquisition of the Steel Motors Company by the Westinghouse company, Mr. Merrick entered the Westinghouse organization. He was immediately selected to prepare plans for a plant in Canada and upon the formation of the Canadian Westinghouse Company, Ltd., in 1903, was sent to the Dominion as superintendent of that company. In this position his ability for organization was quickly recognized. In turn he became manager of works and later vice-president and general manager of the Canadian Westinghouse Company.

During the World War Mr. Merrick was assigned to organize the operations of the New England Westinghouse Company at Chicopee Falls, Mass., and following the war he served in London for two years as special representative of the Westinghouse Electric International Company, after which he returned to Canada to resume his duties with the Canadian company.

In 1925 Mr. Merrick was made vice-president and general manager of the Westinghouse Electric & Manufacturing Company with headquarters in East Pittsburgh, and in the same year was elected a director of the company.

Western Representatives for Automatic Heaters Named

Following a six weeks' visit to the Pacific Coast of W. C. Sears, vice-president, general manager and treasurer of the Automatic Electric Heater Company, of Pottstown, Pa., the following arrangements were completed for distribution and sale in this territory of the electric water heaters manufactured by that company: Clyde L. Chamblin Company will act as northern California representative; Listenwalter & Gough, Inc., have been appointed California distributors and stocks will be carried by them in both their San Francisco and Los Angeles warehouses.

As recently announced, Paul V. Quick, formerly associated with Landers, Frary & Clark, New Britain, Conn., is Pacific Coast manager of the Automatic Electric Heater Company.

The Rockbestos Products Corporation, New Haven, Conn., makers of asbestos insulated wire and cable, is now represented on the Pacific Coast by the Anaconda Wire & Cable Company.

Northwest to Have Chain of Electrical Stores

The Brown-Johnston Company, electrical dealer of Spokane, Wash., through its president, Eric Johnston, has announced the formation of the Electrical B-J Stores to establish a chain of twenty small electrical supply and repair stores in the Pacific Northwest. Associated with the company in the new venture are Percy F. Brittan and L. R. Hamblen, local capitalists.

The first of the new stores is expected to be opened next month in Spokane on the ground floor of the new Paulsen Medical-Dental Building. A second shop also will be opened in Spokane and four will be opened in Seattle. Plans contemplate the extension of the chain to Portland, Ore., and Tacoma, Vancouver, Yakima, Wenatchee and Walla Walla, Wash.

"There are no stores of this type in the country at this time," states Mr. Johnstone. "The feature of these stores will be to offer a repair service comparable to the shoe repair business. Each store will be managed by a man thoroughly capable of offering a complete electrical service."

New Offices and Display Room Are Opened by Motor Company—Space for new offices, the display of equipment, and for an operating exhibit of motors has been allotted in the building of the Pacific Electric Motor Company, Tenth and Oak Sts., Oakland, Calif. Lamps, reflectors, electric heating equipment, wiring supplies and motor parts, Telechron clocks, portable tools and paper pulleys are among the items displayed. A "house warming" was held when the display rooms and new offices were formally opened.

Air Traveler and His Cross-Fin

THIS is the plane that carried E. S. Matthews, general sales manager of the Electro-Kold Corporatoin, Spokane, when he conducted sales meetings of Electro-Kold dealers in all the larger Pacific Coast cities recently. What appears at first glance to be a musical instrument carried by Mr. Matthews for jazzing up the sales meetings is actually the latest model of a cross-fin Electro-Kold refrigerating unit for commercial installations.

Heads Pacific Division of National Lamp Works

The appointment of Robert P. Burrows as manager of the Pacific Division of the National Lamp Works of the General Electric Company, succeeding A. M. Sweeney who has been transferred to the sales department at Nela Park, has been announced by J. E. Kewley, general sales manager.

Mr. Burrows' recent appointment climaxes many years spent in the light-

R. P. BURROWS

ing industry. He jointed the engineering department of the National Lamp Works in 1911 and at the end of three years was head of the commercial engineering section. In 1919 he left the organization to form a company specializing in motion picture theater equipment and subsequently associated himself with the Western Electric Company in St. Louis. He returned to the National Lamp Works, in the Sunbeam Division, in 1923, and for the past two years has served as assistant manager of that division, with headquarters on the Pacific Coast.

In his new capacity Mr. Burrows will have charge of sales in eight of the Western states. His headquarters will be in Oakland.

Joins Radio Manufacturer's Pacific Coast Organization—Edward J. O'Neil, until recently associated with L. G. Reno Company, Oakland, Calif., has jointed the Pacific Coast sales organization of the **Kellogg Switchboard & Supply Company**, Chicago. Mr. O'Neil was for seven years a representative of the Western Electric Company in the San Francisco Bay district and for eight years with the Alexander & Lavenson Electrical Supply Company, of San Francisco, specializing in the sale of electric ranges and radios.

California Distributor Appointed for Fada Radios—H. H. Walker, 1323 Venice Blvd., Los Angeles, has been appointed by F. A. D. Andrea, Inc., as southern California distributor for the Fada line of radio sets and equipment.

The Langley Manufacturing Company, Ltd., of Winnipeg and Vancouver, B. C., has been purchased by the Amalgamated Electric Corporation, Ltd., Toronto. The Langley company, which is an old established Winnipeg firm, with a large manufacturing and distribution branch at Vancouver, has specialized in the production and distribution of electric panels, switchboards, fixtures and electrical equipment for many years. S. Langley, president of the firm, with headquarters in Winnipeg, is being given an executive office in the new company. A. Montgomery is manager of the Vancouver branch.

The Diamond Electrical Manufacturing Company, Los Angeles, has appointed the Robinson Sales Company, 617 Fourth Ave., Seattle, as distributor of the Diamond E products in that city. The O. H. Davidson Equipment Company, 130 West Fourteenth Ave., Denver, has been appointed to handle distribution of the Diamond company's products in the Denver territory.

Square D Company Names Seattle Representative—The Square D Company, Detroit, has appointed Ray D. Flatland, for several years identified with the Portland, Ore., branch of the Robinson Sales Company, as its representative in the Seattle territory, to handle the Square D switch and panelboard and Industrial Controller accounts.

Jones-Lyman & Company, Inc., and the **Utilities Equipment Corporation** have moved their Los Angeles headquarters from the A. G. Bartlett Building, Seventh and Spring Sts., to the building formerly occupied by Detrick-Joslyn Company at 110 North Alameda St., where each company will have offices and warehouse space where large stocks of the various factories each represents will be carried.

The Moore Steam Turbine Corporation, Wellsville, N. Y., has appointed the **Utilities Equipment Corporation** its northern California and Arizona representative. William Van Dev Heuvel, American Bank Building, Los Angeles, will continue to represent the Moore Steam Turbine Corporation in southern California.

New Building for Pacific States Electric Company, Seattle—A reinforced concrete building is being erected at First Ave. and Connecticut St., Seattle, to house the office, salesroom and warehouse of the branch of the Pacific States Electric Company in that city. The structure, of three stories with basement, will occupy an area 90 x 150 ft.

Electric Heating Is Motive of Dinner In Los Angeles

At a dinner meeting held recently in Los Angeles manufacturers, jobbers, dealers, engineers, architects, electrical inspectors, employees of the various power companies, and all others interested in, or affiliated with the electric heating industry gathered to eat an electrically cooked turkey dinner and to hear a program covering the development of electric heating in southern California, and the promise for the future. Sixty guests were present.

R. H. Folsom, associated with the Harris Engineering Corporation, was the principal speaker of the evening. He outlined briefly a new system of electric heating which uses as its basic principal the reverse of the refrigeration cycle, getting heat from the available heat in the atmosphere and transferring it into water or other absorbing medium.

Harry H. Daley of the Majestic Electric Appliance Company outlined a new plan for the development of a popularization of bathroom heating.

A five-minute talk was made by L. A. Francis of the Edison Electric Appliance Company on the possibilities of heavy-duty cooking. Among other facts which were brought out at the meeting was the fact that the electrically roasted turkeys which were served had actually undergone a shrinkage of only 7.6 per cent, as against normal shrinkage in gas ovens of from 15 to 20 per cent.

Standard Electric Stove Co. Announces Contest

A sales contest to be conducted during the month of September has been announced by the Standard Electric Stove Company, Toledo, Ohio, with valuable prizes for the winning entrants. All salesmen employed by authorized Standard dealers are eligible to enter the contest, and prizes will be awarded to all those selling a range a week for four weeks or four ranges during the month. Other prizes will be awarded on a scoring system of hits and runs, following the method of baseball scoring. In addition to the regular prizes awarded all winners, there will be grand prizes for holders of first, second, third, fourth and fifth places in total sales for the period.

Listenwalter & Gough, Inc., of San Francisco and Los Angeles, have recently been appointed wholesale distributors of Standard electric stoves in the State of California.

The General Paint Corporation has announced the appointment of Shirley Walker, formerly assistant to the president of Sherman, Clay & Company, as sales supervisor, with headquarters in San Francisco.

New Equipment

Ear Switch Boxes

Labor saving extended-ear switch boxes for cable and loom are now being manufactured by the National Metal Molding Division of the **National Electric Products Corporation,** Pittsburgh, Pa. These boxes have ears 6 in. long assembled on the ends for vertical mounting in ordinary lath and plaster

walls; and on the sides for horizontal mounting both in ordinary lath and plaster walls, and behind baseboards.

The boxes fasten solidly to studding and timbers so that plaster will not crack around them. By setting the triangular points against studding, and striking ears with a hammer, the points are sunk into timber, and switch box is held in desired position temporarily. The job is finished by driving nails through holes in ears, into studding. —Electrical West, Aug. 1, 1929.

Electric Test Lamp

The Dante tester is a test lamp recently brought out by the **Dante Electric Manufacturing Company**, Bantam, Conn., and is for use in locating blown fuses on circuits. Illumination is furnished by the new Cooper Hewitt Neon glow lamp without filament.

The tester is made in two types, one for 110 volts a.c. and 220 volts a.c. or d.c., and the other for 440 to 600 volts. It eliminates the necessity of using two lamps in series for 220 volts. The lamp is enclosed in a strong rugged fiber case and its long rubber covered wires are provided with insulated fiber handles and plain tips. The cap on the lamp case is colored green for 220 volts and red for 600 volts, corresponding to labels on fuses, thus eliminating all chance of using the wrong lamp by mistake. The tester is small and compact enough to carry in the pocket. It has no filament to burn out and is practically indestructible. List price, $3.'0 for the 110-220-volt lamp; $4 for the 440-600-volt model.—Electrical West, Aug. 1, 1929.

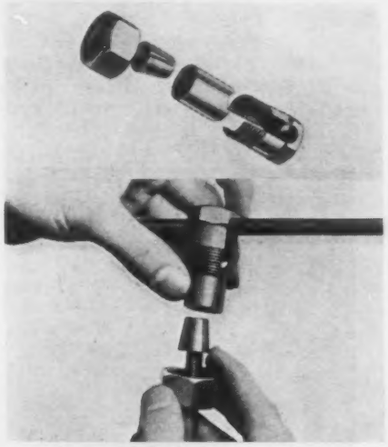
Neon Glow Lamp

A new style of lamp particularly adapted to a number of unique applications is the Neon glow lamp now being manufactured by the **Cooper Hewitt Electric Company,** Hoboken, N. J. The special features of this new lamp are its low current consumption, small light output, distinctive color and absence of filament. It is particularly adapted for use as an indicator where it is desired to show that current is being consumed, as an annunciator or signal lamp for call systems, as an electrician's test lamp, for night lights, illuminated house numbers, holiday decorative purposes, etc., and for laboratory work.

The lamp bulb is 1¼ in. in diameter and fits all standard incandescent lamp sockets. The normal life of the lamp is several thousand hours, according to the manufacturer. It is designed for operation on 110-120 volts a.c., but will operate on d.c. above 150 volts. However, on d.c. only one-half of the electrode glows at a time. When operating on 115 volts a.c. the lamp consumes ¼ watt at .002 amp.—Electrical West, Aug. 1, 1929.

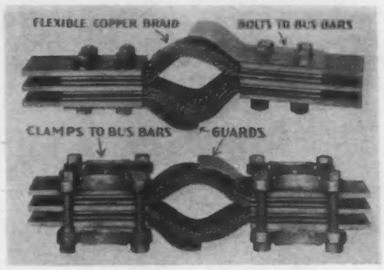
Solderless Connector

A solderless connector with a locking action that holds it tight permanently is being manufactured by the **Penn-Union Electric Corporation,** Erie, Pa., for use on high-tension lines. In mak-



ing a branch connection with the Penn-Union "T" connector there are only four parts to handle—the yoke, body, split sleeve and nut. When the locknut is turned onto the yoke, a split wedge-shaped sleeve forces the body of the connector up tight against the main conductor. At the same time the sleeve clamps tighter to the branch, equalizing the pressure on the main and and branch conductors. These connectors are made in a variety of types —elbows, tees, two-way, three-way, etc., for use with solid rods, copper tubing, or stranded cable. There are combinations and sizes for every electrical requirement, according to the manufacturer.—Electrical West, Aug. 1, 1929.

Bus Bar Expansion Joints

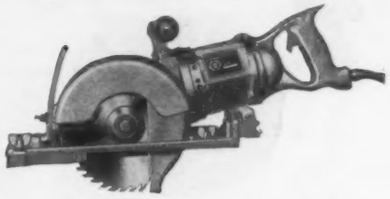


To lessen the number of bus support failures caused by short circuit stresses, vibration, elongation due to expansion, and disalignment, the **Delta-Star Electric Company,** Chicago, has developed the flexible joints illustrated. These joints can be bolted directly to the bus bars or clamped, as desired. Guards are provided to retain the flexible braids during short circuits, thereby not endangering flashover distances.—Electrical West, Aug. 1, 1929.

Portable Electric Saw

New hand saws are announced by the **Black & Decker Manufacturing Company,** Towson, Md., designed respectively for 6-in., 8-in. and 10-in. circular saws. These saws will cross cut and rip lumber up to 3½-in. thick and in addition can be used with a special metal cutting saw for cutting light gage metal or with an abrasive disc for cutting slate, marble, tile, porcelain and other materials. The saw blades are enclosed in telescopic guards so that as the saw progresses in the work the guard automatically telescopes, and when the cut is finished the guard snaps back, entirely covering the saw blade. The saw is arranged with an adjustable shoe which can be set to cut at any depth up to the capacity of the saw. The shoe is adjustable also for cutting at any angle up to 45 deg. for mitering or for the jointing of long edges, and maintains the angle perfectly throughout the entire length of the cut. The shoe is notched to make it easy to follow a pencil line on the work.

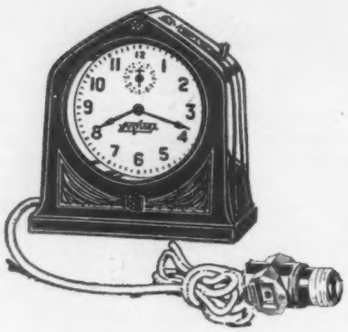
The saws are light in weight and each is shipped in a substantial case as a



convenience for men who take a saw out on the job. The saws have Universal motors for use on a.c. or d.c., and can be furnished for 32, 110, 220 or 250 volts.—Electrical West, Aug. 1, 1929.

Time Control Clock

The Nova control clock, a product of the **Nova Electric Corporation**, 40 West Seventeenth St., New York City, provides automatic time control for radios, house lights, washing machines, heaters, cookers, fans, and other electrical appiances. The clock consumes no current, but will automatically turn on or off



any appliance to which it is connected at any prearranged time and will function on any house current, whether a.c. or d.c. List price of model 100, with art bronze case, is $10; model 105, walnut case, $11.50. Both these models have a rating of 300 watts 250 volts. Model 106, with art bronze case and rating of 660 watts, 250 volts, has a list price of $11.50.—Electrical West, Aug. 1, 1929.

"Quartap" Provides Four Leads From One Outlet

An addition to its line of Bakelite electrical conveniences that has recently been announced by the **Connecticut Electric Manufacturing Company**, Bridgeport, Conn., is the "Quartap," which provides for four leads from a single outlet. A silk-covered cord is provided to which is attached a regular attachment plug cap. This allows the body of the device to be conveniently placed on the table or other piece of furniture where it is handy for plugging in or removing the plug without reaching or stooping.

The product is about 3½ in. in diameter by ⅝ in. high. The bottom

face has four rubber feet to prevent slipping or marring of polished surfaces. All connections and metal parts are concealed, making it shockproof and easy to keep clean.—Electrical West, Aug. 1, 1929.

Electric Hand Saw

A portable tool for use in woodworking mills and by carpenters and contractors is the new Howland electric hand saw manufactured by the **Electric Hand Saw Company**, Seattle. This new tool is a circular saw, driven by a 4/10-hp. motor and mounted on a flexible frame. The saw may be used for either ripping or cross-cutting operations.

This tool may be used "free-hand," or with a mitre box or saw-table, two accessories that have been especially designed for use with the new device. A rafter gage for cutting rafters and studding, which is adjustable for bevels and double mitre and cuts at angles up to 79 deg. is also available. The combination of these accessories with the flexible frame allows the woodworker to make vertical cuts, or bevel cuts up to 45 deg. at any angle with the timber. A mitre square and a ripping guide are supplied with each saw.

The circular saw is 31 in. in circumference, and has a freerunning speed of 2,707 r.p.m., or a peripheral speed of 4,737 ft. The frame and sawguard are very light, being made of aluminum.—Electrical West, Aug. 1, 1929.

Star-Rite Exerciser

An addition to its line of Star-Rite appliances is the Star-Rite exerciser recently placed on the market by the **Fitzgerald Manufacturing Company**, Torrington, Conn.

The exerciser is mounted on a rigid, self-balancing platform which eliminates the necessity for hold-down straps for attachment to floor or wall. Very

little floor space is required for the exerciser when not in use for the platform can be folded tightly against the machine. An accurate degree of vibration for safe and stimulating massage is obtained in this exerciser for while the motor runs at 1,725 r.p.m. it has been reduced on the vibrating arms to approximately 625 r.p.m.

The exerciser is equipped with both wide and narrow belts as well as handle grips and is finished in French gray. The retail price is $95.—Electrical West, Aug. 1, 1929.

Bakelite Handle Cap

A new finger-fitting cap has been introduced by the **Beaver Manufacturing Company**, Newark, N. J. Insertion and withdrawal of the cap is greatly facilitated by the convenient handle. The cap is made of Bakelite in a choice of colors.—Electrical West, Aug. 1, 1929.

"Thru-the-Rug" Wiring Set for Table Call Bells

A "Thru-the-Rug" wiring set for table call bells, that brings a pendant type push button switch convenient to the hand of the hostess, by means of a concealed wiring system, has been an-

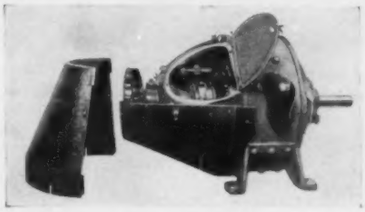
nounced by the **Belden Manufacturing Company**, Chicago. The push button is fastened to the table so that it is always in the same place and is easily located.

A connector is used to carry the circuit through the rug. This device consists of a thin Bakelite base supporting fine pins which pass through the rug without damaging it. A cap that fits over these pins provides an outlet for the push button extension cord. The contacts are visible and should the plug be disconnected it can be replaced in an instant. The connector is attached to the floor plate with a flexible cord and the rug cannot be torn in cleaning or arranging the furniture because it can move freely in any direction. A screw driver is the only tool required to install the device.—Electrical West, Aug. 1, 1929.

Fan Cooled Motor

A new totally enclosed fan-cooled motor for d.c. applications is announced by the **Westinghouse Electric & Manufacturing Company,** East Pittsburgh.

The cooling system does not interfere with the effectiveness of the motor enclosure. The bracket openings are closed with solid flat enclosing covers and gaskets. This type of construction permits the use of sealed sleeve bear-



ings and thus the motor is totally enclosed and sealed from dust and fumes.

This motor is applicable to coal handling equipment, paint shops, foundries, and anywhere where the air is full of foreign matter which may be injurious to motor windings.—Electrical West, Aug. 1, 1929.

New Electric Cleaner

A new light-weight vacuum cleaner of the revolving brush type, designated as Universal Model No. 58, has been announced by **Landers, Frary & Clark,** New Britain, Conn. The manufacturer states that the same quality of materials and workmanship are maintained

in this model as in other Universal cleaners selling at higher prices; that it has the same sturdy motor and fan and the same strength of suction as other models. The model 58 cleaner retails for $39.50; attachments $7 extra. —Electrical West, June 1, 1929.

Recent Publications

Kuprox Rectifiers and Electrolysis Drainage Valves—A set of technical bulletins has been issued by **The Kodel Electric and Manufacturing Company,** Cincinnati, Ohio, describing the Kuprox metallic disc rectifiers for operating time clock and signal recording systems, telegraph and telephone circuits, and Kuprox non-mechanical electrical valves for electrolysis drainage.

Transmission Line Construction—In a booklet entitled "Milestones" the **Ohio Brass Company,** Mansfield, Ohio, shows by numerous photographs the use of O-B high-voltage suspension insulators on towers of transmission lines traversing territory in many sections of the United States and Canada.

Barometer and Vacuum Recorders for Steam Turbines—The Uehling Instrument Company, 473 Getty Ave., Paterson, N. J., has published a six-page bulletin, No. 150, describing the Uehling combined barometer and vacuum recorder for steam turbine operation.

Hotpoint Catalog Supplement—A catalog supplement, Y-575, has been issued by the **Edison Electric Appliance Company,** Chicago, giving descriptions and prices of fourteen new Hotpoint appliances placed on the market since the issuance of the company's general Hotpoint catalog.

Heat-Treating Furnaces—The Electric Furnace Company, Salem, Ohio, has published a booklet entitled "From Steel Balls to Oil Stills," describing furnaces manufactured by that company for the heat-treating of a wide variety of products.

Mobile Color Lighting—"Lumitone" is the title of a bulletin recently issued by **Curtis Lighting, Inc.,** Chicago, describing the Lumitone device for manual or automatic remote control of mobile color lighting.

Centrifugal Compressor—A twelve-page illustrated bulletin, No. A-50, describing the "Triple-A" centrifugal compressor, is being distributed by the **Allen Air Appliance Company, Inc.,** New York.

South Bend Lathes—A new general catalog, No. 90-A, has just been issued by the **South Bend Lathe Works,** South Bend, Ind. Prices of the complete line of lathes are given.

Range Circuit Cabinets—Bulletin No. 42, issued by the **Wadsworth Electric Manufacturing Company, Inc.,** Covington, Ky., describes the Wadsworth line of 60-amp. range circuit cabinets with or without plug fuse distribution for flush and surface mounting.

Watthour Meters—"Registers of Revenue" is the title of an illustrated booklet, publication C-1753-A, recently issued by the **Westinghouse Electric & Manufacturing Company,** Newark, N. J., and describing Westinghouse watthour meters of various types.

Supplement to Benjamin Catalog—Benjamin Electric Manufacturing Company, Des Plaines, Ill., has published supplement No. 1 to Catalog No. 24, containing descriptions and listings of recent additions to the Benjamin line of electrical products.

Air Break Gang Operated Switch—The Champion Switch Company, Kenova, W. Va., is distributing a new bulletin, No. 1-I, describing and listing an improved type of air break gang operated switch for voltages up to and including 220 kv.

Air Break Circuit Breakers—The Roller-Smith Company, 233 Broadway, New York, has issued supplement No. 1-A to Bulletin No. 580 covering some recent additions to the type EAF line of small enclosed air break circuit breakers.

Fuse Equipment—Bulletins No. 503 and 504, recently issued by **W. N. Matthews Corporation,** 3722 Forest Park Blvd., St. Louis, Mo., contain data on the latest improvements and additions to the line of Matthews fuse switches and disconnecting switches.

Porcelain Insulators—In an illustrated booklet, entitled "It Took 5,000 Years," the **Lapp Insulator Company, Inc.,** LeRoy, N. Y., describes the evolution of the process of clay manufacture for Lapp insulators.

Vaporproof Industrial Fixtures—Bulletin No. 2129 of the **Crouse-Hinds Company,** Syracuse, N. Y., contains price lists on that company's complete line of vaporproof industrial fixtures.

General Electric Publications—Recent booklets and bulletins issued by the **General Electric Company,** Schenectady, N. Y., include the following:

Selsyns for Remote Signaling, Control, and Indication.
Switchboard Panel and Benchboard Pipe Fittings (GEA-940A).
Type PQ Relays (GEA-970A).
Generator Voltage Regulators (GEA-709A).
Motor Drive for Metal-Working Machinery (GEA-1104).
Automatic Sectionalizing Switches (GEA-1109).
Outdoor Switching Equipment (GEA-1029A).
Current-Limiting Reactors (GEA-1116).
G-E Arc-Welding School (GEA-1125).

ELECTRICAL WEST Barometer of Industrial Activity in Western States

THE first half of 1929 witnessed by far the greatest manufacturing activity in the history of the Western states. The average rate of production for the six-months period was 19.7 per cent over the same period in 1928. The peak of operations in this section appears to have been reached in May, which month as a rule witnesses the greatest activity of the first half of the year. The rate of activity throughout the half-year, however, was consistently above that reported for the same months last year.

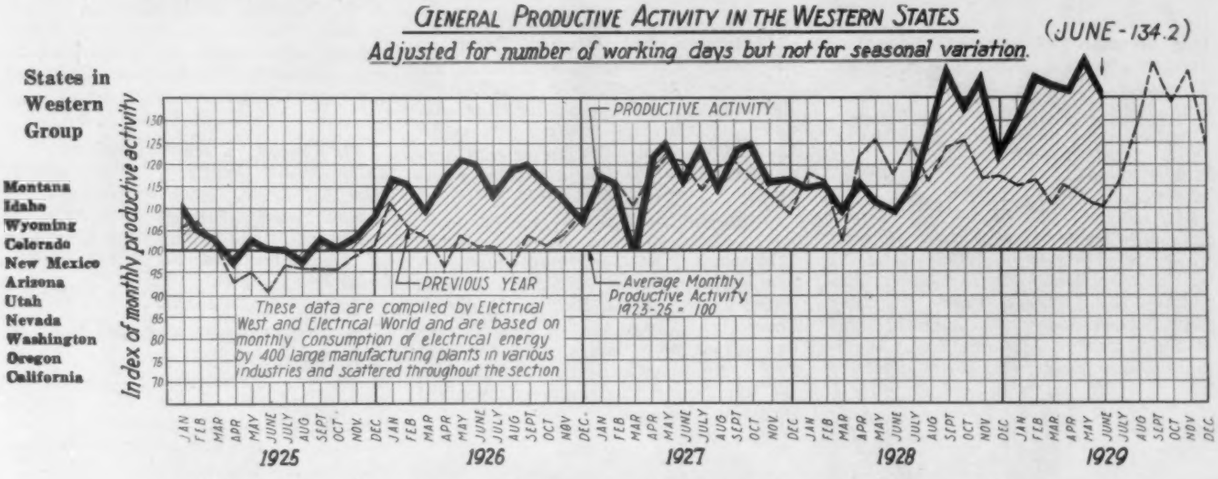
June witnessed a material drop in the rate of manufacturing operations as compared with May, after corrections are made for the number of working days. The rate of operations during June was 7.2 per cent under May, but was still 16.4 per cent above June last year.

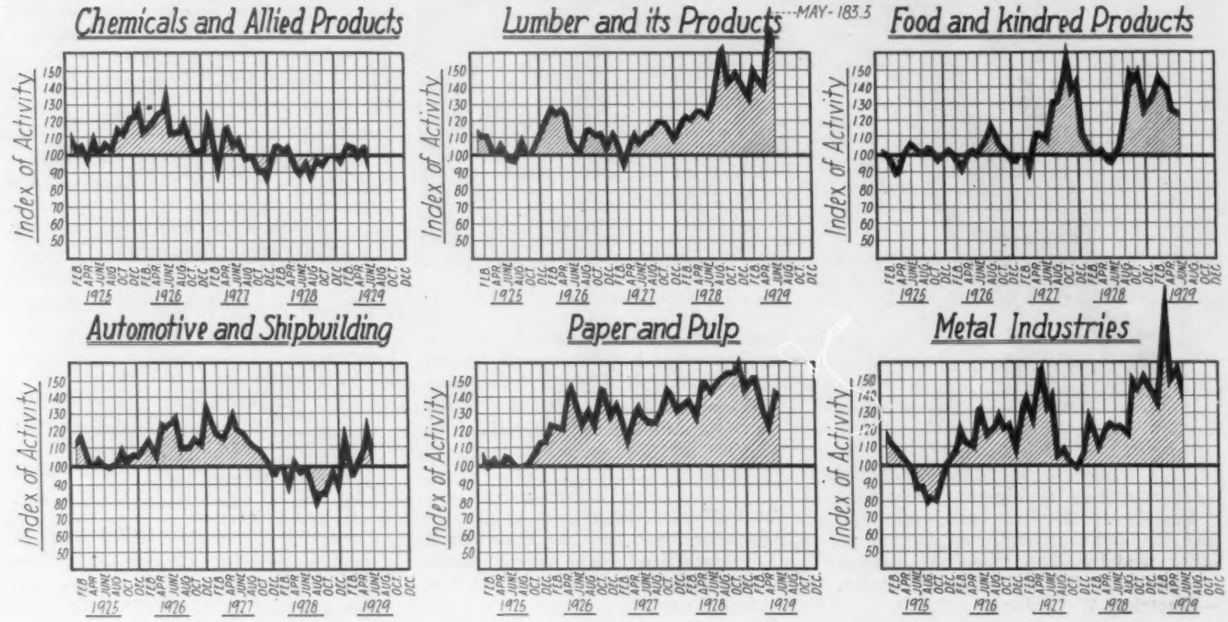
The lumber industry of the Western states witnessed a material drop in the rate of operations during June as compared with May. The June operations in these mills were 12.2 per cent under the record month of May, but were still 21.8 per cent over June last year. The operations in the food and kindred products industry of the West during June witnessed a continuance of the downward trend which started in March. The June operations were 3.2 per cent under May but 10 per cent above June last year. It appears that during the first six months of the year the food industry recorded an average rate of operations 29.5 per cent above the same period last year.

Manufacturing activity of the country as a whole in June held at virtually the same high level as in the preceding months of this year. The June rate of operations, not corrected for seasonal variation, was but 1.2 per cent under May. This brings the average rate of activity for the first half of 1929 to a point 13.7 per cent higher than that established in the like period last year.

Indexes of Industrial Activity in the Western States
(All figures adjusted for number of working days.)

	June 1929	May 1929	June 1928	Av. 1st Half 1929	Av. 1st Half 1928
All industry	134.2	144.7	118.5	137.8	115.2
Chemical and allied products	91.2	103.1	88.2	96.9	100.2
Food and kindred products	121.5	125.4	110.4	136.2	105.2
Forest products	161.0	183.3	132.2	155.5	125.6
Metals group	134.1	160.0	122.2	160.6	123.3
Paper and pulp	142.0	146.7	144.5	142.9	141.4
Rubber and its products	197.0	196.3	136.8	198.9	144.1
Shipbuilding	99.7	127.0	95.7	107.7	96.0
Stone, clay and glass	167.0	130.8	153.0	140.7	153.9




PRODUCTIVE ACTIVITY IN THE PRIMARY INDUSTRIES OF THE WESTERN STATES
Chemicals and Allied Products
Lumber and its Products
MAY - 183.3
Food and kindred Products
Automotive and Shipbuilding
Paper and Pulp
Metal Industries
Index of Activity